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Work Plan and Progress Report

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A Systems Analysis and Preliminary Plan for the Pennsylvania Transportation System

October 31, 1967

prepared for

The Governor's Committee for Transportation
Commonwealth of Pennsylvania

by

The Franklin Institute Research Laboratories
Carnegie-Mellon University
The Pennsylvania State University

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INTRODUCTION

This report presents an overview of the study program on Technical Advisory Committee Operational Projects 5 and 6, a plan for accomplishing this work as presently conceived, and progress to date. Included in this report are the work plans and progress by Franklin Institute Research Laboratories, Carnegie-Mellon University, and Pennsylvania State University on this study. These work plans refine and update the technical approach and work statements given in the technical proposal for this study program dated August 18, 1967. Further changes may be made in the work plans as necessary to accomplish the overall objectives of Projects 5 and 6.

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I. OVERVIEW OF STUDY PROGRAM

a. Project Organization and Responsibility

An overview of the study program with the organizations responsible for each primary activity is shown in Figure 1-1. As can be seen from the diagram, the Franklin Institute Research Laboratories (FIRL) will provide overall project management on Projects 5 and6, coordinate the infrastructure survey (Project 4) being done by Wilbur Smith and Associates with Projects 5 and 6, perform the demand analysis (Project 5), and prepare the Interim Transportation Master Plan (Project 6a). Carnegie-Mellon University (CMU) will formulate a methodological framework and implementation program for the orderly development of an integrated transportation system in Pennsylvania (Project 6b). The Pennsylvania State University (PSU) will direct the development of demand allocation, link allocation, and land use impact models for use in the development of methodology for comprehensive statewide transportation planning. Projects 5 and 6a are directed to short range transportation planning whereas Project 6b is concerned with long range transportation planning.

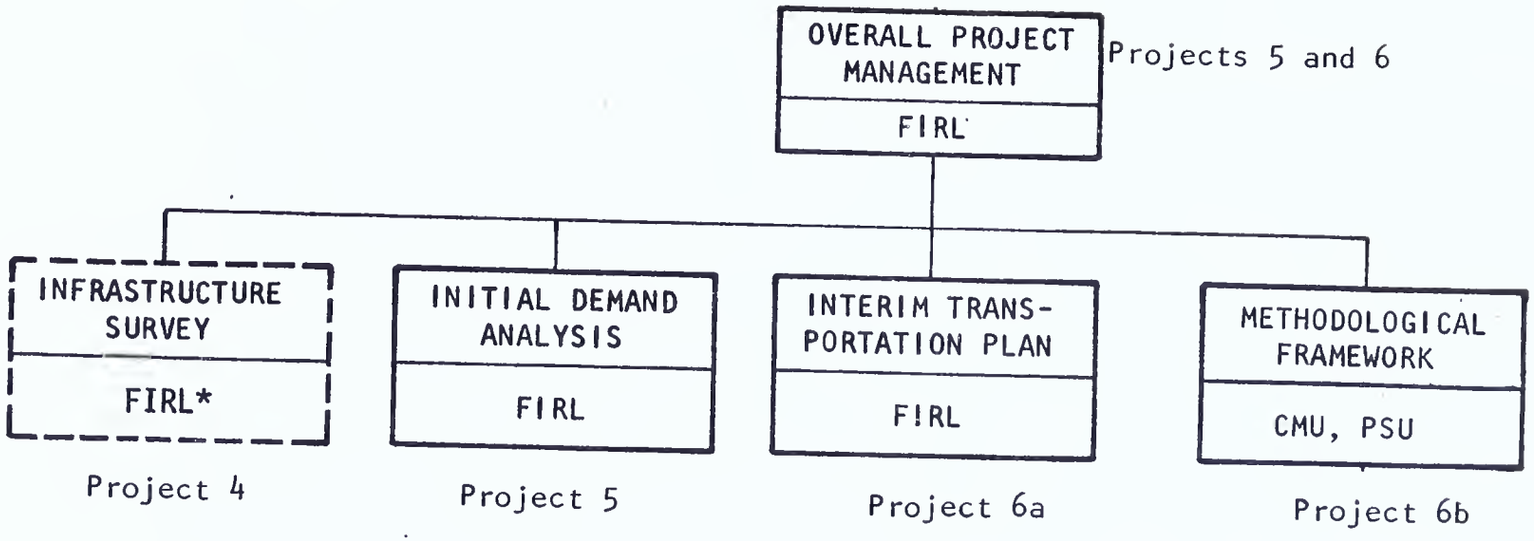
b. Technical Approach

Figure 1-2 shows in simplified block diagram form the eleven major tasks required to perform this work. Although the tasks are shown in logical order, many of the tasks are parallel and overlap since the transportation planning process is not sequential.

For purposes of this study, the transportation system in Pennsylvania will be defined in terms of the following components:

The persons and things being transported (demands)
The means in which they are conveyed (modes)
The networks over which the means of transportation operate (links)

The scope of this project has delineated the modes of interest to include air, rail, highway, pipeline and water transportation, and the modes to be considered are obvious. In addition, we will be concerned generally with all movements of people and goods. The initial problem remaining then is



*Coordination only; actual survey being done by Wilbur Smith and Associates.

Figure 1-1. Project Organization

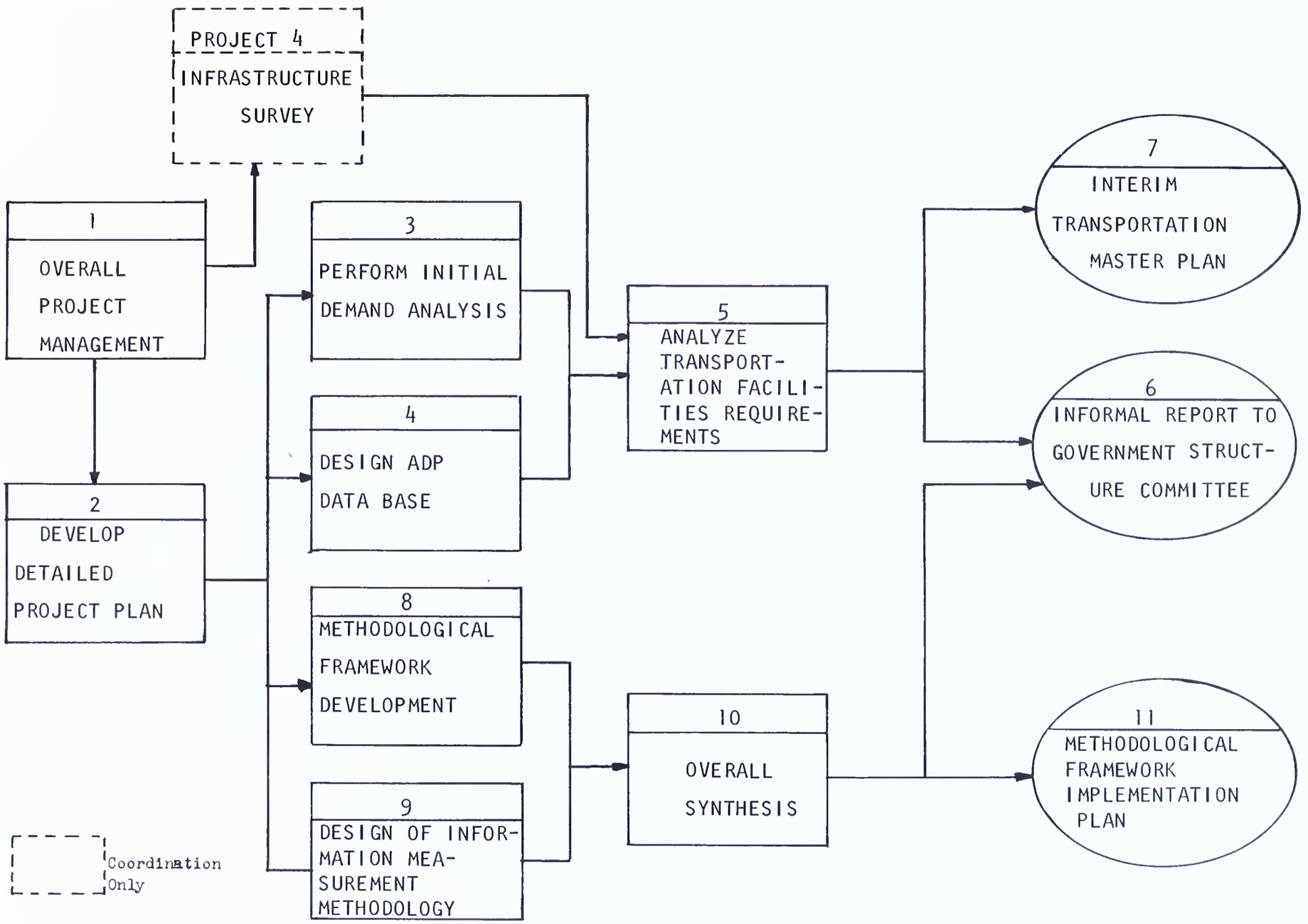


Figure 1-2. Block Diagram of Technical Approach

a specification of the transportation *system* to be considered; this involves describing the network to be studied.

Networks are defined to consist of links and nodes. Nodes are the centers of population and industry that create the demand for transportation services. Links are the channels of transportation connecting various pairs of nodes which supply the demands for transportation.

Primary to the development of an Interim Transportation Plan is the need for determining the nodes and links which will be considered in both the demand analysis and infrastructure survey. Tasks 1 and 2 are designed to achieve an integrated interim transportation plan and methodological framework for comprehensive statewide transportation planning. In Task 3 demand projections for the nodes selected will be prepared. Outputs from this task will cover the work required on Technical Advisory Committee Project 5.

Task 4 involves the development of an ADP data base to support the activities of the proposed Pennsylvania Department of Transportation and for analyzing transportation facility requirements. In Task 5, the demand projections (Task 3) will be matched with outputs from the Infrastructure Survey (Project 4), currently being performed by Wilbur Smith and Associates to identify transportation deficiencies, determine facility requirements, and delineate programs for further study and action by the proposed Department of Transportation. The outputs of this task and Task 10 will also be used for preparation of an informal report to the Government Structure Subcommittee to provide guidance for structuring the new Pennsylvania Department of Transportation (Task 6). Finally an Interim Transportation Plan Plan summarizing the work of Task 1 through 6 will be prepared. This plan will cover the requirements of Project 6a.

Tasks 8, 9, 10 and 11 are designed to formulate a methodological framework and implementation program for long range transportation planning in response to Technical Advisory Committee Project 6b. This framework will serve as a major tool for transportation system development by the proposed Pennsylvania Department of Transportation. Details on each of the eleven tasks are described in the work plan.

c. Schedule

Figure 1-3 is a schedule showing the eleven tasks on Projects 5 and 6 and the organizations responsible for each task. Project 5 will be completed by January 15, 1968. Projects 6a and 6b will be completed by April 1, 1968.

d. Reports

The following reports will be prepared as part of this study program:

Monthly Progress Reports as required to the Governor's Committee for Transportation

Informal Report to the Pennsylvania Department of Transportation task force by January 31, 1968

Transportation Facilities Requirements Report by February 29, 1968

Interim Transportation Master Plan by April 1, 1968

Transportation Methodology Development Plan by April 1, 1968

Figure 1-3. Overall Schedule

Task	Task Description	1967			1968			Organization Responsible
		Oct	Nov	Dec	Jan	Feb	Mar	
1	Project Management and Overall Coordination							FIRL
2	Develop Detailed Project Plan							FIRL*
3	Perform Initial Demand Analysis							FIRL
4	Design ADP Data Base							FIRL
5	Analyze Transportation Facility Requirements							FIRL
6	Prepare Informal Report to Government Structure Subcommittee							FIRL*
7	Prepare Interim Transportation Master Plan							FIRL
8	Methodological Framework Development							CMU†
9	Design of Information Measurement Methodology							CMU
10	Overall Synthesis							CMU†
11	Methodological Framework Implementation Plan							CMU

* Support by CMU and PSU

† Support by PSU

II. WORK PLAN

The following is a description of the work plans prepared by The Franklin Institute Research Laboratories, Carnegie-Mellon University, and Pennsylvania State University to accomplish Projects 5 and 6. The work plans are described in terms of tasks and subtasks. A master schedule showing the tasks and subtasks and the organizations responsible for their performance given in Figure 2-1.

A. Franklin Institute Research Laboratories

As previously discussed, FIRL will be responsible for overall project management on Projects 5 and 6, coordination of Project 4 with 5 and 6 and technical direction and execution of Projects 5 and 6a. This work covers the following seven tasks.

Task 1 - Project Management and Overall Coordination

Task 2 - Develop Detailed Project Plan

Task 3 - Perform Initial Demand Analysis

Task 4 - Design ADP Data Base

Task 5 - Analyze Transportation Facility Requirements

Task 6 - Prepare Informal Report to Government Structure Subcommittee

Task 7 - Interim Transportation Master Plan

Each of these tasks will be described below:

Task 1 - Project Management and Overall Coordination

The Franklin Institute Research Laboratories (FIRL) will be responsible for overall project management on Projects 5 and 6 and for coordinating the work to be performed by Wilbur Smith and Associates on Project 4 with Projects 5 and 6 to assure compatible results.

a. Projects 5 and 6

FIRL will provide overall project management and will coordinate the activities of Pennsylvania State University and Carnegie-Mellon University. The FIRL project manager will be responsible for schedule control, financial control and technical coordination of the work to be performed by each of the three contractors. Technical coordination and project

Figure 2-1. Detailed Schedule

Task	Task Description	1967			1968			Organization Responsible
		Oct	Nov	Dec	Jan	Feb	Mar	
1	Project Management and Overall Coordination							FIRL
a	Projects 5 and 6							FIRL
b	Project 4							FIRL
2	Develop Detailed Project Plan							FIRL*
a	Select Links and Nodes							
b	Establish Framework for Analyzing Links and Nodes							FIRL
3	Perform Initial Demand Analysis							FIRL
a	Collect Data							FIRL
b	Develop Techniques for Demand Forecasts							FIRL
c	Prepare Demand Forecasts by Mode of Transportation							FIRL
d	Prepare Report							FIRL
4	Design ADP Data Base							FIRL
a	Review Available Information							FIRL
b	Analyze Information Requirements							FIRL
c	Storage Format and Retrieval Design							FIRL
5	Analyze Transportation Facility Requirements							FIRL
a	Match Demands against Infrastructure to Identify Deficiencies							FIRL
b	Estimate Impact of New Technology on Transportation in Pennsylvania							FIRL
c	Develop Facilities Plan							FIRL
d	Prepare Report							FIRL

*Support by CMU and PSU.

Figure 2-1. Detailed Schedule (cont)

Task	Task Description	1967			1968			Organization Responsible
		Oct	Nov	Dec	Jan	Feb	Mar	
6	Prepare Informal Report to Government Structure Subcommittee				———			FIRL*
a	Prepare Preliminary Plan for Pennsylvania DOT				———			FIRL
b	Prepare suggested List of Activities				———			FIRL
7	Interim Transportation Master Plan					———	———	FIRL
8	Methodological Framework Development	———	———	———	———	———		CMU †
a	Node Framework	———	———					PSU
b	Node Allocation		———	———	———	———		PSU
c	Link Framework	———	———					PSU
d	Link Allocation		———	———	———	———		PSU
e	Land Use Impact	———	———	———	———	———		PSU ‡
f	Socio-economic Forecasts		———	———	———	———		CMU
g	Formulation of Alternative Transportation Systems		———	———	———	———		CMU
h	Network Simulation			———	———	———		CMU †
i	Alternative Systems Evaluation		———	———	———	———		CMU
j	Programming and System Implementation			———	———	———		CMU
k	Management and Finance					———		CMU
9	Design of Information Measurement Methodology				———	———		CMU 7
10	Overall Synthesis	———	———	———	———	———		CMU †
11	Methodological Framework Implementation Plan					———	———	CMU

* Support by CMU and PSU
† Support by PSU
‡ Support by CMU

management will be provided through the prepatation of monthly progress reports and project staff meetings. Additionally procedures will be established to avoid duplication of effort with respect to data collection and contacts.

b. Project 4

FIRL will coordinate the Infrastructure Survey with Projects 5 and 6 to ensure compatible study results. The demand projections developed by FIRL will be matched with the Infrastructure Survey to identify deficiencies and bottlenecks in the transportation links and develop preliminary estimates of transportation facility requirements. To facilitate this matching, the demands and links for different modes of transportation must be described in terms of common characteristics. Meetings will be held with Wilbur Smith and Associates and their sub-contractors to assure that the links and nodes to be considered, units of measurement, and other output data are compatible.

Task 2 - Develop Detailed Project Plan

A detailed project plan will be developed in conjunction with Carnegie-Mellon University and Pennsylvania State University for conducting this study. The tasks outlined in the proposal will be reviewed and revised as necessary in order to achieve consistent and compatible results. Several planning sessions will be held among the study participants on Projects 5 and 6 and Wilbur Smith and Associates to develop a common set of links and nodes and framework for analysis.

a. Select Links and Nodes

A common set of links and nodes for different modes of transportation will be selected. Acceptable means for dealing with out-of-state demands, inter-node---intra-node interface and other factors will be developed. Definitions will be prepared of what constitutes a link and a node.

b. Establish Framework for Analyzing Links and Nodes

A common framework will be developed for use in the infrastructure survey, demand analysis and transportation methodology development. This framework will include the following:

Time Period to be used for planning

Methodology for classifying commodities

Units of measurement

Methodology for dealing with capacities, costs, and utilization of transportation facilities

Task 3 - Perform Initial Demand Analysis

Demand projections will be prepared for the nodes included in this study based on trend extrapolations and relationships of transportation demand to economic, demographic, and social factors. These projections will be limited to inter-node movements. Demand projections will be developed for each node-pair for each mode of passenger and commodity travel.

a. Collect Data

Data will be collected on the following:

Historical travel data for trend extrapolation

Origin-destination data to estimate trip generation and attraction of each node

Information as to trip purpose in order to separate inter- and intra-node travel

Population growth, telephone traffic growth and economic and social data to fit into the demand models

b. Develop Techniques for Demand Forecasts

Alternative and complimentary models will be selected and/or formulated for demand projections to utilize as many benchmarks as can be obtained. The aim is to get two somewhat different methods for forecasting demand in each category. At this time it is not possible to specify which approaches will be most suitable since this depends on the

available data. However, the following approaches are under consideration:

Trend Projection and Regression
Allocation
Indicator Models

c. Prepare Demand Forecasts by Mode of Transportation

A series of demand forecasts of the demand for passenger and freight transport via automobile and bus (passenger only) truck (freight only), railroad, air, waterway (freight only) and pipeline (oil and gas only) will be prepared for each link connecting each pair of selected nodes and for the state as a whole. Passenger demand forecasts will be given in passenger and passenger miles and freight demand forecasts will be given in ton miles. The demand for freight transport will be broken down into commodity categories in so far as the data permits.

Task 4 - Design ADP Data Base

In this task of an ADP information retrieval system will be designed to support the activities of the proposed Pennsylvania Department of Transportation. This ADP system will provide capabilities for storage of such data as population, land use, and economic activity statistics for delineated sections of the state, as well as demand and capacity statistics for existing and planned transportation facilities and networks throughout the state. The system will be flexible, storing data in such a manner as to facilitate access to basic information elements as well as combined and processed forms of these basic elements. The system will support the present demand analysis, and can be used for matching the demands against the capacities of the existing infra-structure. Processing routines will be implemented to the extent permitted by the time limitations of the project. It is hoped that, at the minimum, complete formats will be developed, methods of storage described, and basic processing routines flowcharted.

a. Review Available Information

Existing literature will be reviewed to determine those data elements presently available for transportation analyses. Existing ADP

systems now supporting transportation studies will also be reviewed. Interviews will be conducted with people knowledgeable about available data for individual transportation modes.

b. Analyze Information Requirements

After having surveyed data presently supporting transportation surveys and research, an attempt will be made to determine the form of such data most appropriate to the activities of the Department, as well as to identify what information is presently deficient or unavailable. In this way, the ADP model may allow for the incorporation of new data as it should become avaialble, without hindering the implementation of the ADP system based on existing data elements.

c. Storage Format and Retrieval Design

Once all appropriate elements have been identified, formats and methods of storage will be outlined. Element coding structures will be defined to facilitate processing, matching, and retrieval. Standard processing and retrieval routines will be flowcharted as time permits. Such routines would provide the capabilities for matching, combining, and selectively retrieving basic data as should be required. Partial implementation of the ADP system to support present analyses will also be accomplished, again as is feasible within the time framework of the project.

d. Prepare Report

A report summarizing sub-tasks 3 a, b, c will be prepared by January 15, 1968.

Task 5 - Analyze Transportation Facility Requirements

This task consists of matching the demand projections against the intra-structure to identify gaps and deficiencies in transportation service and to develop preliminary estimates of transportation facility requirements. A literature review will be conducted to determine the feasibility and impact of new and improved transportation concepts and techniques on transportation service in Pennsylvania. Preliminary

cost estimates of required new transportation facilities will also be prepared. A plan for further study and action by the proposed Pennsylvania Department of Transportation will be prepared.

a. Match Demands against Infrastructure to Identify Deficiencies

The demand projections will be matched against the capacity of existing networks by manual and/or ADP techniques to identify gaps and deficiencies in links by mode of transportation. Algorithms for assigning demand projections to highways will be used as necessary. The outputs from the matching will form the basis for a preliminary estimate of new transportation facility requirements.

b. Estimate Impact of New Technology on Transportation in Pennsylvania

A state-of-the-art review will be conducted of new and improved transportation concepts and techniques to delineate a program of further technological study by the proposed Pennsylvania Department of Transportation. The review will cover improved and new means of transportation as well as terminal facilities.

c. Develop Facilities Plan

Alternative approachs for dealing with identified deficiencies will be suggested based on the technology review and on preliminary order-of-magnitude cost estimates for the new facilities. Plans for further study and action will be prepared including possible sources of funding for these programs.

d. Prepare Report

A report summarizing the work of sub-tasks a through c will be prepared by February 29, 1968.

Task 6 - Prepare Informal Report to Government Structure Subcommittee

FIRL will prepare an informal report for use by the Government Structure Subcommittee to provide guidance for structuring the new Pennsylvania Department of Transportation. Carnegie Mellon and Penn State

will also provide inputs to this report which will be prepared by January 31, 1968.

a. Prepare Preliminary Plan for Pennsylvania DOT

A preliminary plan for use by the Pennsylvania DOT will be prepared. This plan will contain a discussion of problems and potential deficiencies in the Pennsylvania transportation network and the implications of the present study for the new Department.

b. Prepare Suggested List of Activities to be Undertaken by Pennsylvania DOT

A suggested list of studies and other activities to be undertaken by the Pennsylvania DOT will be prepared.

Task 7 - Interim Transportation Master Plan

A report summarizing the work of Tasks 1 through 6 as outlined above plus Project 4 (Infrastructure currently being surveyed by Wilbur Smith and Associates) will be prepared by April 1, 1968. This report will include the following:

Study background, goals and objectives
Study scope and procedures
Description of demand analysis
Description of existing infrastructure
Analysis of transportation facility requirements
Influence of new technology on transportation in Pennsylvania
Rationale for dealing with identified transportation deficiencies
Preliminary development plan for Pennsylvania DOT
Recommended studies and actions to be undertaken by Pennsylvania DOT

B. Carnegie-Mellon and Pennsylvania State Universities

The purpose of the Carnegie-Mellon - Penn State joint effort on Project 6b is to propose a methodological framework for the orderly development of an integrated Transportation System in the Commonwealth.

This methodological framework within which the planning effort is couched will serve as a major tool for comprehensive planning of transportation systems in Pennsylvania, and become an integrated part of the total work effort of the Department of Transportation.

The methodological framework consists of a series of activities undertaken sequentially but continually revised and updated. The magnitude of these efforts will be defined in terms of appropriate mathematical models, flow diagrams, computer programs, and non-quantifyable factors. The product of this joint effort will be an overall design for developing this framework to increasing levels of sophistication over time.

The methodological framework will be the basis for constructing a program of transportation system development to be implemented by the new Pennsylvania Department of Transportation. The nature of the proposed development plan would be such that the new Department could stage its planning efforts to accommodate a variety of techniques and levels of detail. Pilot studies to test or verify specific planning models as they relate to Pennsylvania will be proposed for initiation by the Transportation Department.

Regional transportation planning efforts on a statewide basis are just emerging. New York State, through its Department of Transportation, has proposed a multi-billion dollar transportation program to include capital investments for all modes, including highway, rail, urban transit and airports. The State of California has devised a program of integrated transportation planning, and the State of Connecticut has created an Interregional Planning Program which gives considerable attention to transportation systems planning. Furthermore the Federal Government, through its Department of Transportation, is currently planning for transportation needs in the Northeast Corridor. In Pennsylvania, forward-thinking regional studies are in progress for the eastern and western parts of the State.* All of these planning efforts

* Delaware Valley Regional Planning Commission and Southwestern Pennsylvania Regional Planning Commission.

are being reviewed for relevance to the envisaged activities of the proposed Department of Transportation for Pennsylvania.

A tentative vision of the overall methodological framework has been agreed upon by the Carnegie-Mellon - Penn State group, and consists of four major tasks. These are

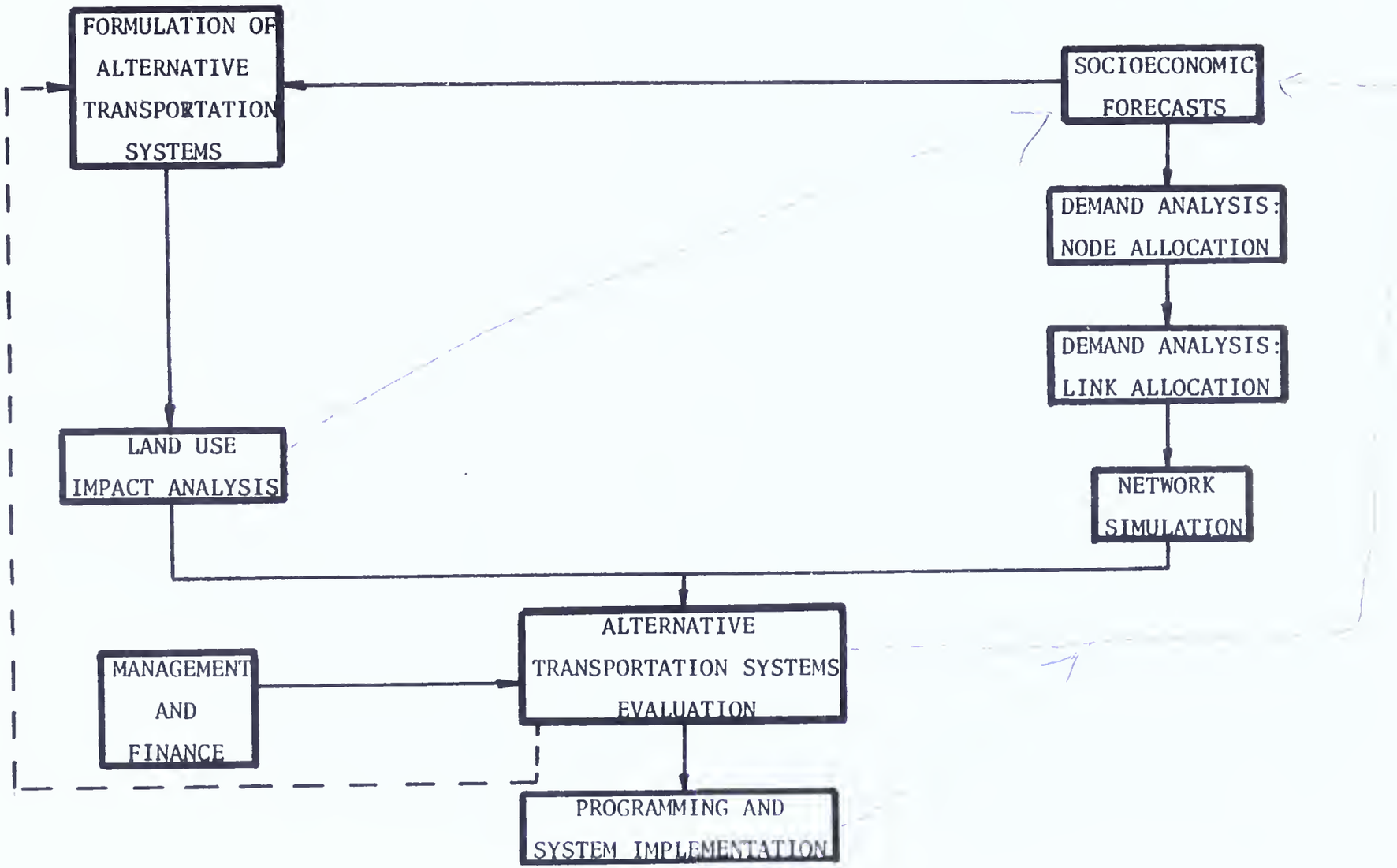
Task 8 - Methodological Framework Development
Task 9 - Design of Information Measurement Methodology
Task 10 - Overall Synthesis
Task 11 - Methodological Framework Implementation Plan

The methodology framework development, which is illustrated in Figure 2-2 is similar to that developed by the Northeast Corridor Transportation Project but modified to accomodate the specific objectives of this study. The methodological framework development involves a series of 11 subtasks which will be integrated into an overall methodological framework implementation plan. Additionally information measurement methodology will be designed to develop truly comprehensive state planning methodology.

Carnegie-Mellon University will have overall responsibility for Tasks 8, 9, 10, and 11. Pennsylvania State University will have responsibility for the node design/allocation, link design/allocation and land use impact efforts in Task 8. A description of each of the four tasks follows:

FIGURE 2-2

METHODOLOGICAL FRAMEWORK
FOR
DEVELOPMENT OF AN INTEGRATED
STATE TRANSPORTATION SYSTEM



Task 8 - Methodological Framework Development

This task consists of a series of 11 subtasks. Each of the subtasks is described by the organization responsible as indicated below:

a. Pennsylvania State University

1. Node Framework — This effort involves formulation of the framework of nodes for modeling purposes. As previously indicated, the nodes represent the centers of economic activity, and in the approach suggested in the original proposal, each node is treated as a single multiple-product firm. Consequently, the efficacy of the final model is contingent to some extent upon the proper selection and characterization of nodes in the state. In other words, realistic model outputs require delineating the important variables that identify nodes.

2. Node Allocation — This effort will provide a plan for the development of a demand or node model to be included in the over-all methodological framework. The final model will require techniques for predicting output at each node and for deriving the flows among the nodes with respect to people and various classes of commodities. The node allocation methodology requires the performance of two tasks. The first is the projection of outputs from the nodes and the second is the allocation of outputs among the nodes.

3. Link Framework — Basically, links characterize the transportation network connecting the various nodes in the state. As in the case of the nodes, it is necessary that the links be characterized in some meaningful fashion. Generally, this would mean identifying modes of transportation in terms of their performance and cost characteristics. The cost characteristics would include transport as well as what might be called non-transport costs. The latter would include such quality of service items as time-in-transit, reliability, safety, etc.

4. Link Allocation — This effort involves describing a plan for the development of a model which will allocate the projected flows of the node allocation model among the various modes of transportation in the network. Basically, this involves what is sometimes referred to as a modal

split model, i.e., how traffic will be split among the various modes of transportation.

5. Land Use Impact — This effort involves measuring, in so far as possible, the interaction between alternative transportation systems or configurations and socio-economic acitvity. Whether impact is handled vis-a-vis a separate model or incorporated into the node allocation model remains to be decided. However, "impact" must be incorporated into the over-all methodological framework. The land use and demographic characteristics of the region of a node give rise to the demand and the supply of goods and services. A flow of goods and passengers through the transportation network is thus generated. The characteristics of the transportation system, however, are determined by land use and demography as well as by the flow of goods and passengers. The dynamic aspect of the model is introduced by handling the "feed back loop", i.e., that the flow of goods and passengers will have an effect upon the character of the region and the transportation system itself. Carnegie-Mellon University will contribute to this effort.

b. Carnegie-Mellon University

1. Socio-economic Forecasts — This effort will review and evaluate analytical techniques for estimating economic and demographic activity within the State and its subareas, considering such econometric tools as simple trend analysis, prorating techniques, economic base theory, input-output economics, and small area allocation models based on accessibility concepts.

2. Formulation of Alternative Transportation Systems — This effort will objectivize the formulation of alternative network systems based on existing patterns of network usage, and on expressed State policies for future land use and development. The guidelines and analytical techniques developed will be applicable for hypothesizing broad ranges of technological alternatives and spatial arrangements.

3. Network Simulation — This effort will evolve a general framework for developing a computer simulation model of the Pennsylvania transportation network. Such a model would assign internodal travel demands to

specific routes of the network and determine the expected pattern of equilibrium flows and operating conditions. Pennsylvania State University will contribute to this effort.

4. Alternative Systems Evaluation — Straightforward techniques for comparing alternative transportation systems have been developed but have relevance only where indirect impacts are negligible. Statewide transportation planning depends upon a broader base of factors but because of difficulties in placing a monetary value upon many relevant consequences, the evaluation of alternative transportation plans incorporates subjective (i.e., non-quantifiable) policy variables. This effort will focus upon the provision of information taxonomy, decision theory, and a dialogue with policy-makers, thus improving the objectivity of investment and regulation decisions.

5. Programming and System Implementation — This effort will focus on specific project implementation and staging, given the selection of a comprehensive transportation plan for the State. This question will be given analytical structure, and the feasibility of applying optimization techniques (e.g., linear, quadratic and integer programming) will be investigated.

6. Management and Finance — This effort will produce guidelines for decisions concerning ownership and operating policies related to transportation facilities. An overall framework will be developed for examining alternative pricing strategies, and for objectively viewing questions of taxation and subsidization.

Task 9 - Design of Information Measurement Methodology

In this task the general principles of cost-benefit analysis will be adapted to the problem of acquiring appropriate data necessary to implement theoretical transportation planning models. A criterion of maximixing the quality of ultimate investment and regulation decisions will be utilized.

Task 10 - Overall Synthesis

This task will be concerned with the continuous coordination of the work required in Tasks 8 and 9, maintaining clear identification of each of the inputs and outputs and interrelationships of the subtasks as the study

proceeds. It will further evolve a general design for the entire man-machine planning strategy required to put all of these components together.

Task 11 - Methodological Framework Implementation Plan

Based on the methodology framework in Task 8, information measurement methodology in Task 9, and overall synthesis in Task 10, a plan for further development and implementation of methodology for comprehensive statewide transportation planning will be prepared. A report fully documenting the implementation plan will be prepared by April 1, 1968.

III. PROGRESS TO DATE

The primary progress to date has been the development of a detailed project plan and common framework for carrying out this study program, data collection for the demand analysis and literature review of node and link allocation models and methodology for transportation planning.

Task 1 - Project Management and Overall Coordination

a. Contractors' Meetings

Meetings were held with all of the contractors on Projects 4, 5 and 6 on October 3, 1967 and October 19, 1967 at the Franklin Institute Research Laboratories (FIRL) to discuss the projects, resolve common problems, establish a common framework for transportation planning and analysis, and review the individual contractor work plans and progress to date and develop an overall project plan. The October 19 meeting was also attended by a representative from the Institute of Public Administration who is working on the Commonwealth Department of Transportation Structure (Project 7). Separate meetings have also been held between FIRL and Wilbur Smith & Associates, FIRL and Pennsylvania State University (PSU), and FIRL, PSU, and Wilbur Smith and Associates with regard to link and node selection as well as the framework for analyzing the links and nodes selected. A meeting was also held by FIRL, Carnegie-Mellon University (CMU), and PSU to discuss the overall methodological framework for transportation planning. Regular weekly meetings have also been held between CMU and PSU to coordinate the work on Project 6b.

b. Administrative Controls

1. Master Work Plan and Schedule

A master work plan and schedule covering the work to be performed by each of the contractors on Project 5 and 6 has been prepared and is discussed in Task 2. This work plan and schedule will be used for project monitoring.

2. Progress and Financial Reports

Procedures have been developed for the submission of monthly progress reports by each contractor in order to monitor the work on Projects 5 and 6.

These project reports will cover the work performed during the preceding month and will be submitted to FIRL by the 10th of each month. FIRL will prepare a consolidated progress report for submission to the Governor's Committee for Transportation as required. Procedures for approval of monthly expenditures remain to be worked out.

3. Coordination of Contacts

Procedures have been adopted to coordinate the data collection program and minimize duplication of effort. All contacts to the members of Technical Advisory Committee will be coordinated by FIRL, all contacts with railroads and railroad regulatory agencies by Louis T. Klauder & Associates (subcontractors to Wilbur Smith & Associates on Project 4), all contacts on the Northeast Corridor Study by CMU, and all contacts with highway departments and agencies by Wilbur Smith & Associates.

4. Master Document File

A master file is being maintained at FIRL of all documents obtained from this study program. A list of the documents collected to date on the demand analysis by FIRL is given in Appendix A. Each contractor will submit monthly a list of the documents acquired.

Task 2 - Develop Detailed Project Plan

Detailed work plans have been developed by each of the contractors and merged into an overall plan as outlined in this report. The work plan cover the nodes and links to be used and the methodology for analysis and transportation planning.

a. Selection of Links and Nodes

1. Pennsylvania Nodes

A first step in analyzing the demand for transportation servies is the definition of an appropriate sets of nodes to be used for the Interim Master Transportation Plan. This involves determining the smallest areal units for which the analysis will be performed.

The major determinant in making this selection is the availability and compatibility of economic, demographic, and travel data over time. The

various censuses provide a large portion of the economic and demographic data which is available. Some of these data are reported by Census Regions, Census Divisions, States, State Economic Areas (SEA's), Counties, Enumeration in Standard Metropolitan Statistical Areas (SMSA's), for Standard Locational Areas (SLA's). The SMSA's in Pennsylvania include 22 counties plus Susquehanna County in the Binghamton, N.Y. SMSA, Figure 3-1. When the counties with a city of more than 25,000 population (in 1960) are included, we still have added only four additional counties. This listing of potential nodes is given in Table 3-1.

While this enumeration clearly omits large areas of Pennsylvania, it does include many of the major airports served by scheduled air service,[1] and the major rail terminals in the Commonwealth. It also includes the only major waterways (from Wilmington to Trenton and along Lake Erie) where public (as opposed to private) dock facilities exist. By aggregating counties into nodes and choosing a major population center to represent the node, we can include all the airports served by major airlines and also cover the entire Commonwelath. The problem here is the method for aggregating the counties. One alternative is to use county aggregations employed for planning purposes, such as the Highway Districts, Figure 3-2, or the state planning board regions, Figure 3-3. In addition, the Highway Department Planning Bureau has defined a set of Planning Regions, Figure 3-4, based on the best compromise to achieve homogeneity among factors, such as land use, population density and growth. Clearly, these do not overlap. Further complications are introduced when the boundaries used to define areas for other transportation studies are considered. A primary source of highway data is the Edwards-Kelcey report which used the survey districts shown in Figure 3-5 and projected the projected the 1975 passenger vehicle highway corridor travel shown in Figure 3-6.[2] Based on this data, we had postulated the additional Pennsylvania nodes shown in Table 3-2. This divided the state into 29 nodes as shown in Figure 3-7. However, it now appears feasible and useful to use a smaller nodal breakdown for analyzing highway travel which will be based on the corridor intersections developed by Wilbur Smith & Associates.[3] In most cases, this will mean the primary nodal division will be established along county boundaries with additional intra-county subdivision to be carried

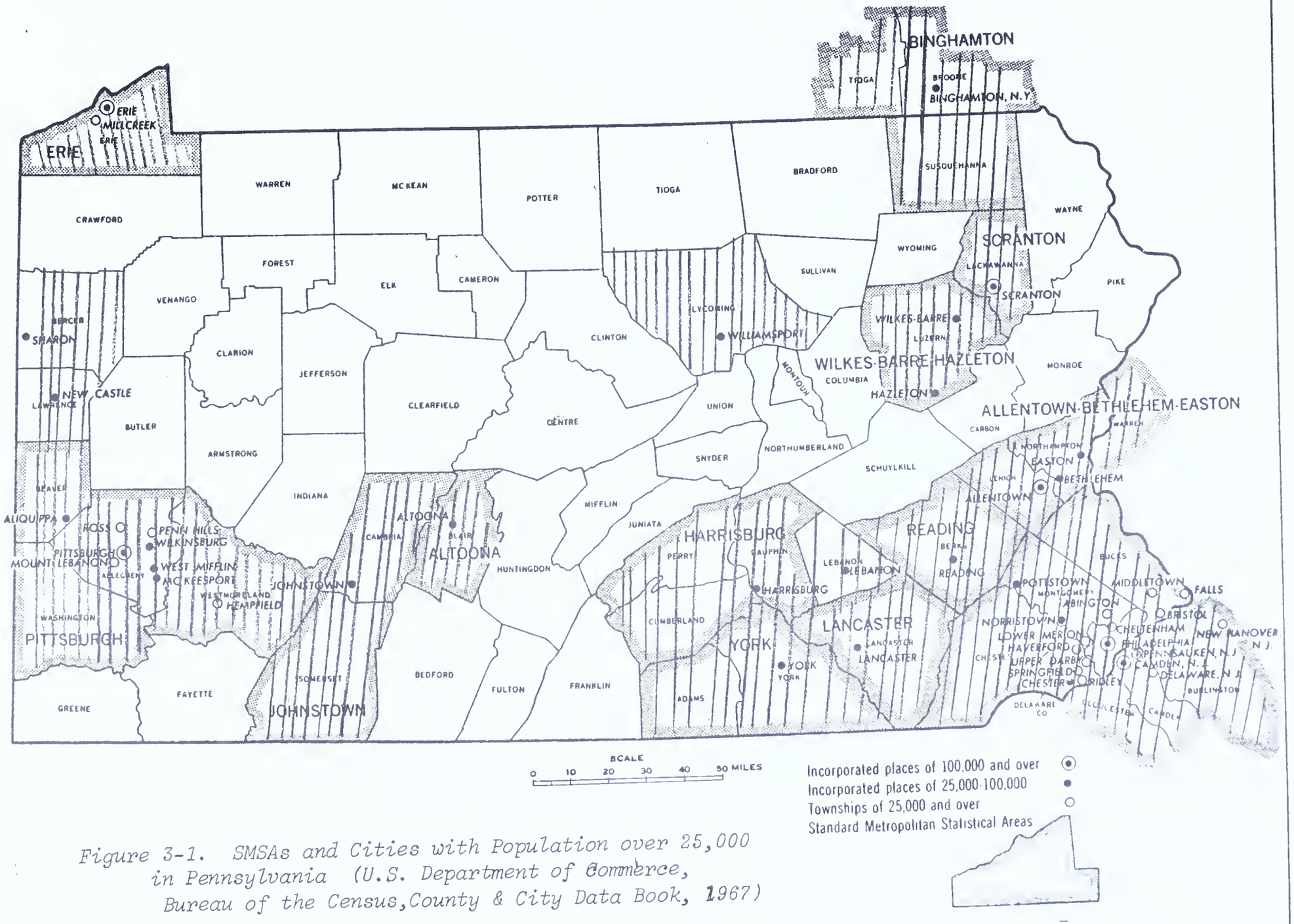


Figure 3-1. SMSAs and Cities with Population over 25,000 in Pennsylvania (U.S. Department of Commerce, Bureau of the Census, County & City Data Book, 1967)

Table 3-1
Suggested Pennsylvania Nodes - SMSA's And Cities
Over 25,000 Population *

Node Count	City/SMSA
1	ALLENTOWN-BEHHLEHEM-EASTON. PA. - N.J. Lehigh County Northampton County Warren County, N.J.
2	ALTOONA SMSA Blair County, Pa.
3	BINGHAMTON, N.Y. SMSA Broome County, N.Y. Tioga County, N.Y. Susquehanna County, Pa.
4	ERIE SMSA (11) Erie County
5	HARRISBURG SMSA Cumberland County Dauphin County Perry County
6	JOHNSTOWN SMSA Cambria County Somerset County
7	LANCASTER SMSA Lancaster County
8	LEBANON Lebanon County
9	NEW CASTLE Lawrence County Butler County
10	PHILADELPHIA SMSA Bucks County Chester County Delaware County Montgomery County Philadelphia County Camden County, N.J. Gloucester County, N.J.
11	PITTSBURGH SMSA Allegheny County Beaver County Washington County Westmoreland County
12	READING SMSA Berks County
13	SCRANTON SMSA Lackawanna County
14	SHARON Mercer County
15	WILKES-BARRE-HAZELTON SMSA Luzerne County
16	WILLIAMSPORT Lycoming County
17	YORK SMSA Adams County York County

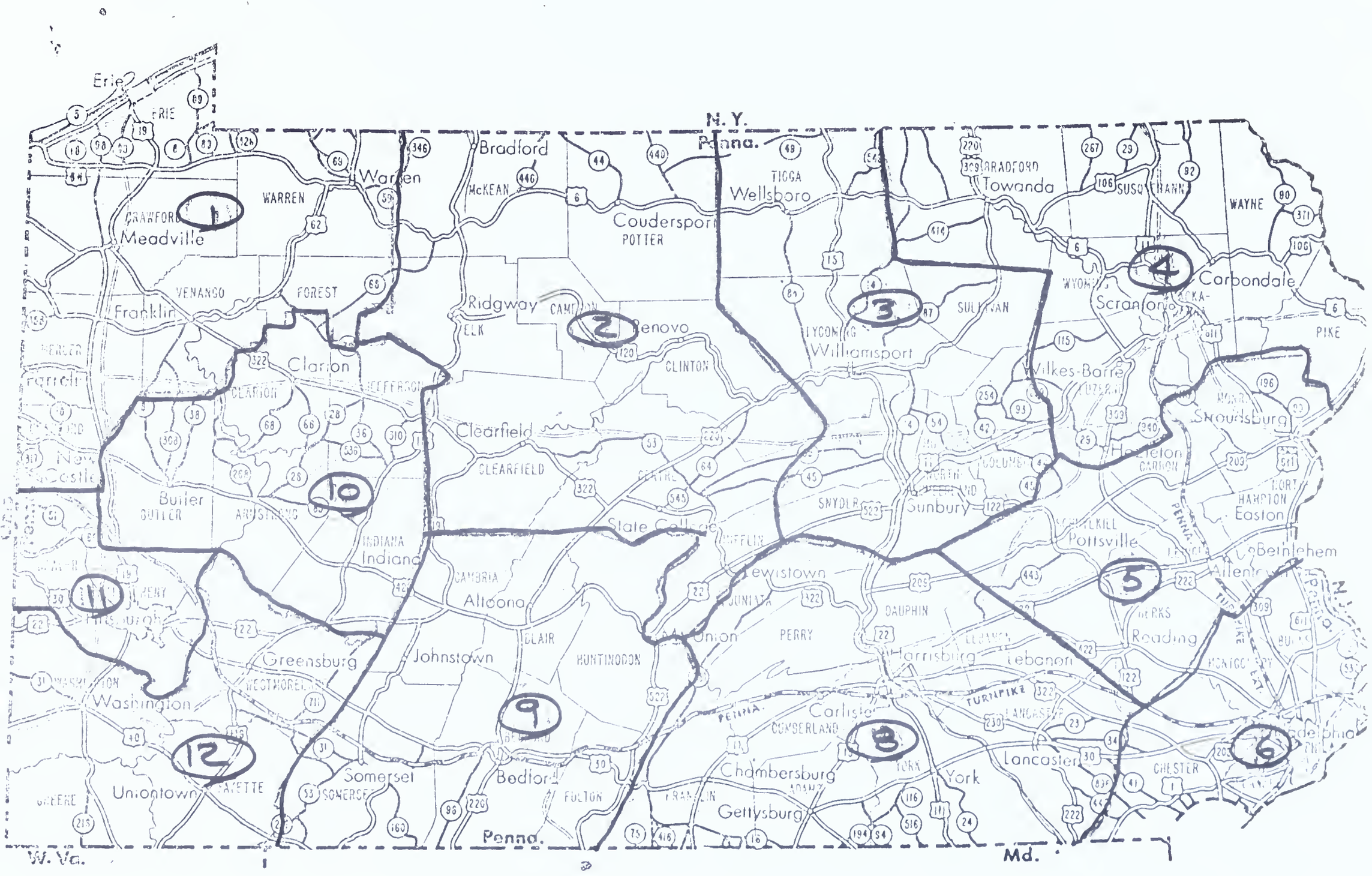


Figure 8-2. Highway Districts

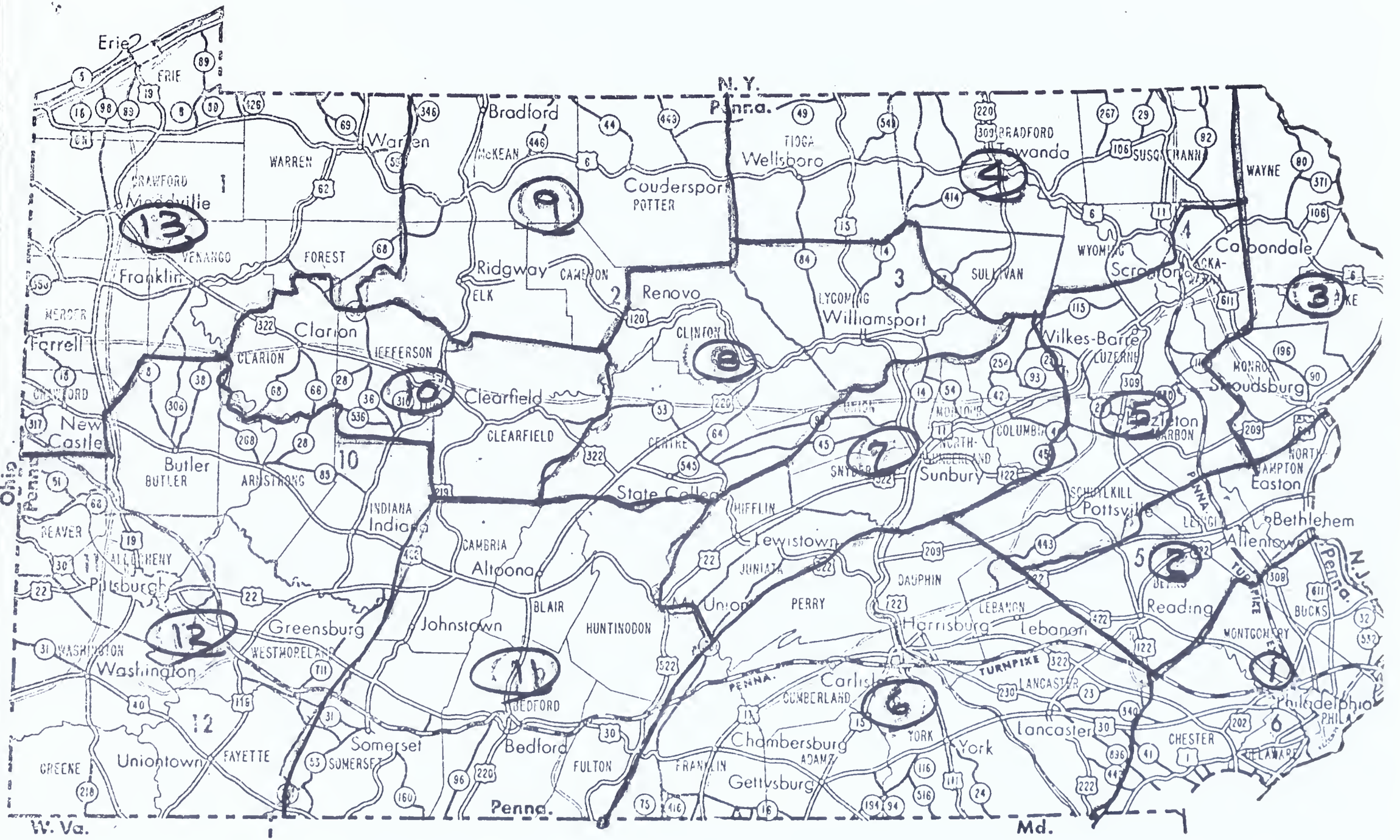


Figure 3-3. State Planning Board Planning Regions

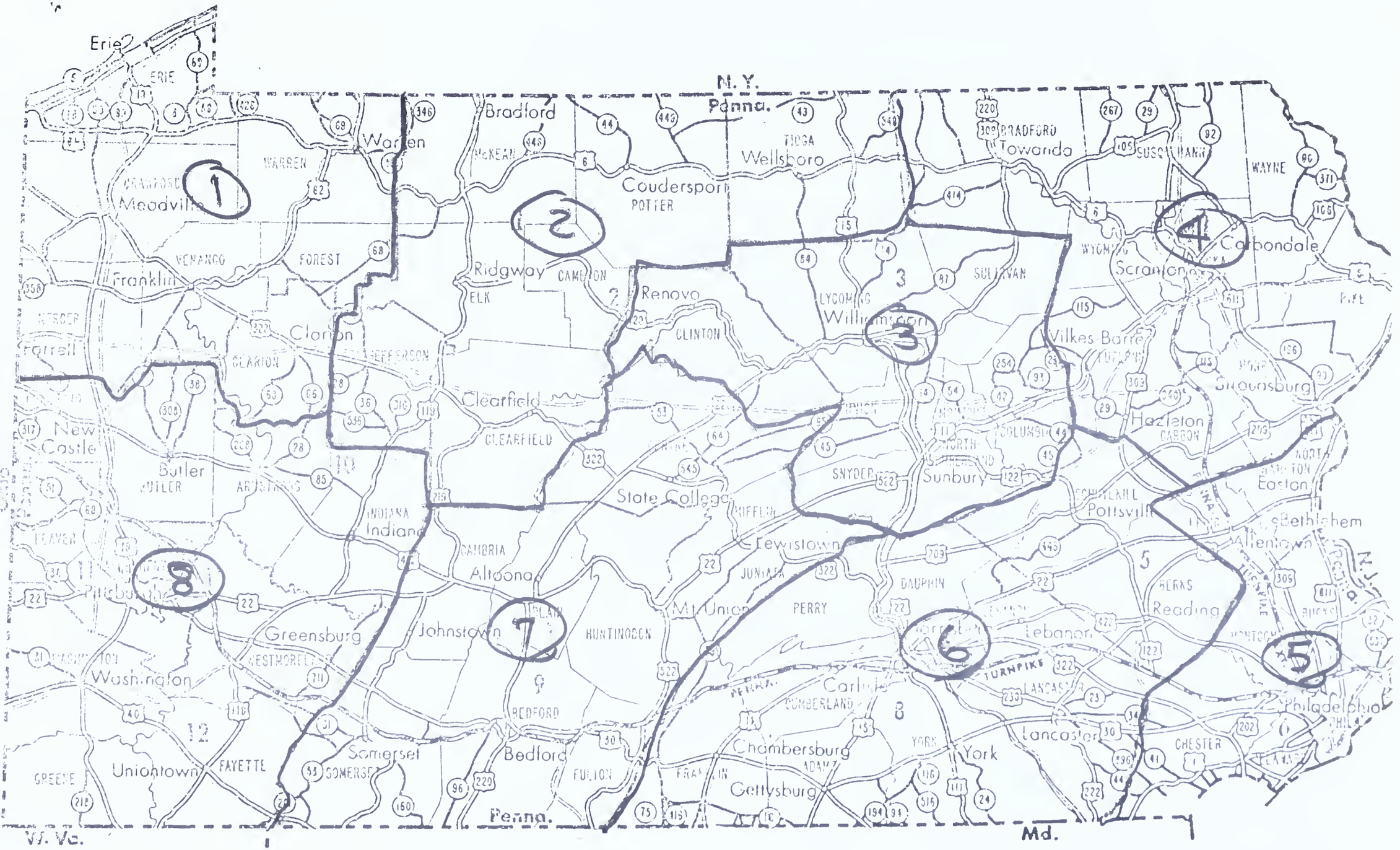


Figure 3-4 State Highway Department Planning
(Regional Boundaries)

Figure 3-5

Interview Stations and Survey Districts

(Edwards-Kelcey Study)

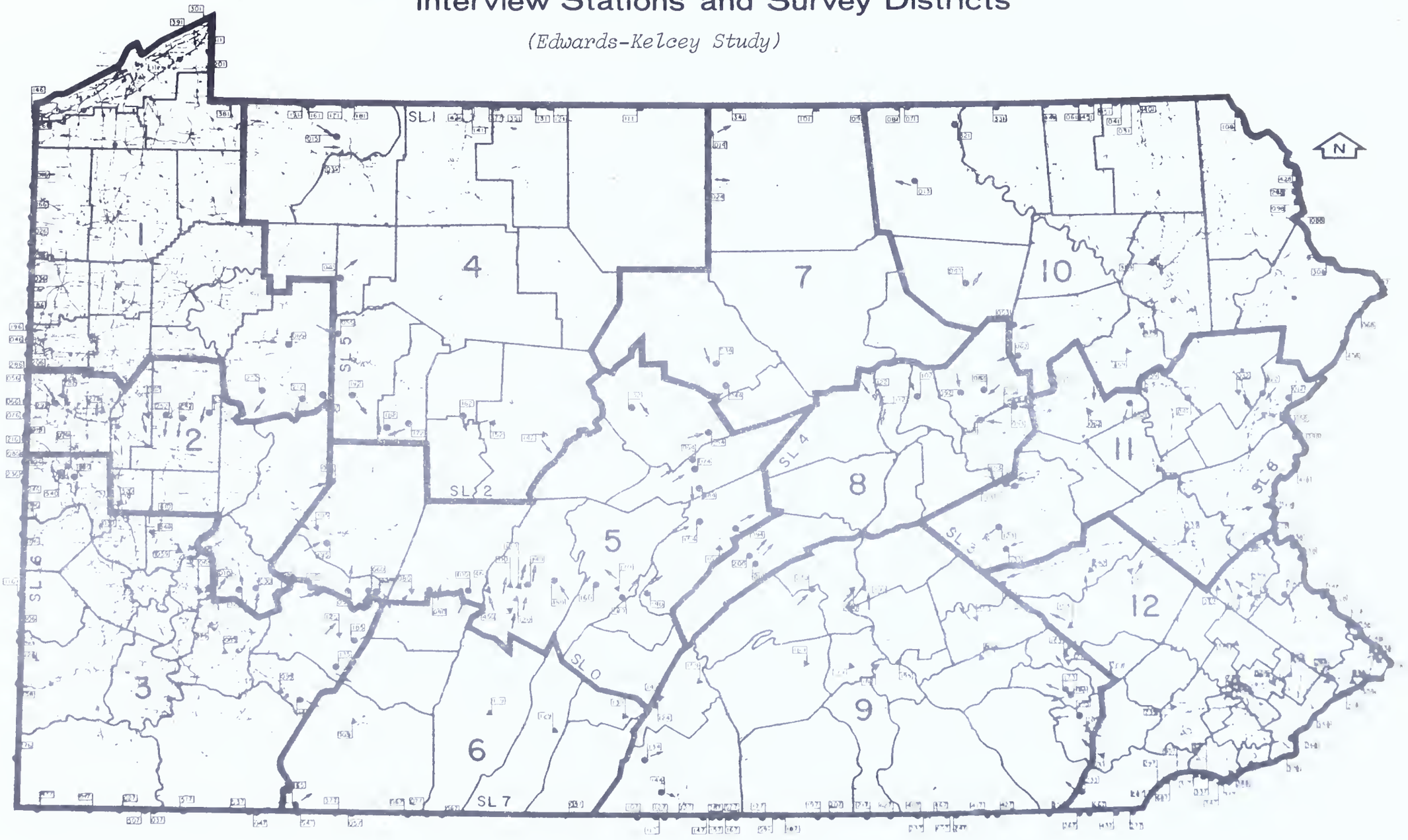
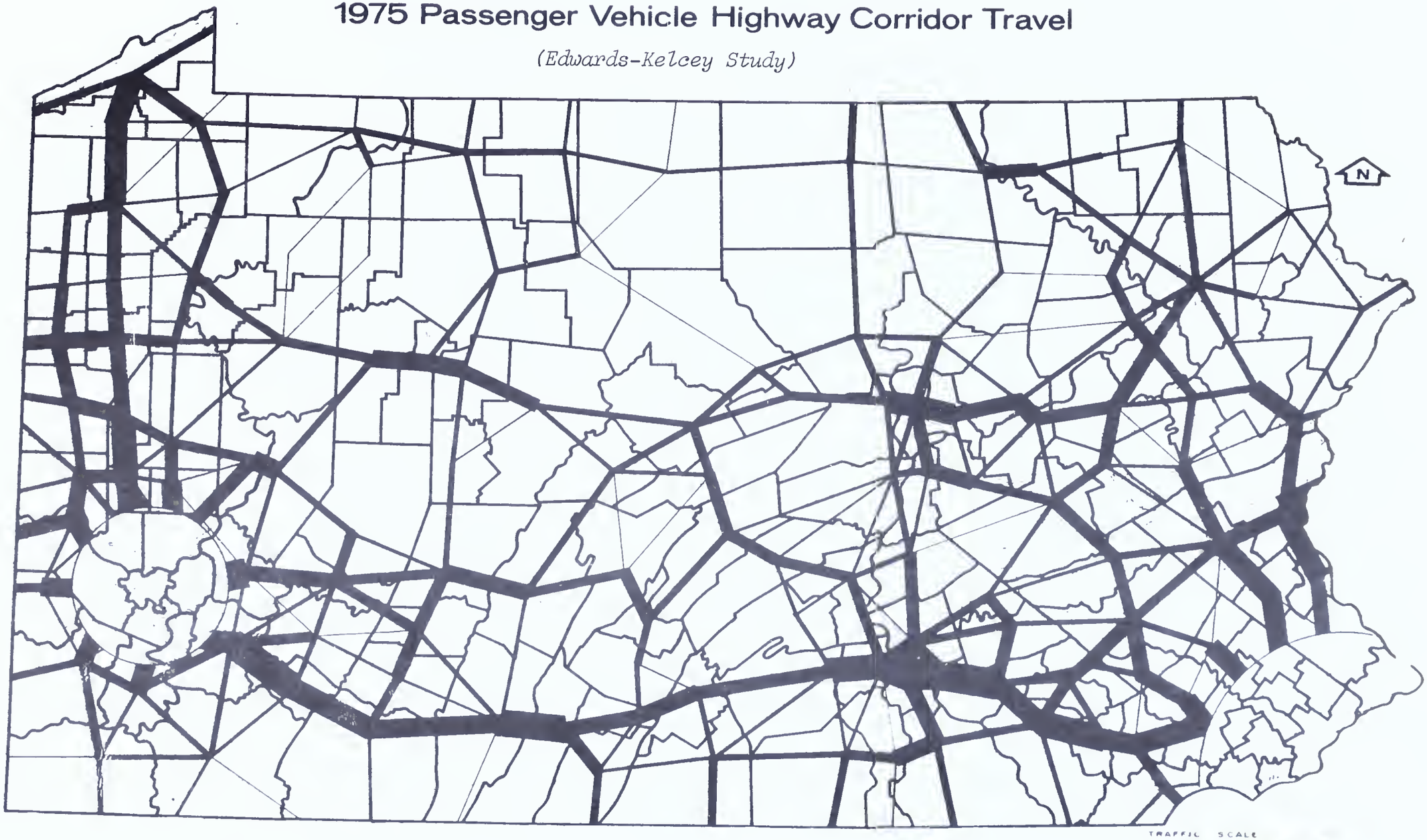


Figure 3-6

1975 Passenger Vehicle Highway Corridor Travel

(Edwards-Kelcey Study)



EDWARDS AND KELCEY
ENGINEERS AND CONSULTANTS

NOTE: ALL FLOW BANDS REPRESENT GENERAL CORRIDOR TRAVEL AND NOT VOLUMES ON INDIVIDUAL HIGHWAYS

Table 3-2
Additional Pennsylvania Nodes for Intra-Commonwealth Transportation - Combinations of Counties

Node Count	City/SMSA
18	UNIONTOWN Greene County Fayette County
19	CHAMBERSBURG Bedford County Fulton County Franklin County
20	LEWISTOWN Huntingdon City Mifflin City
21	SUNBURY-LEWISBURG-MILTON Juniata County Snyder County Union County Northumberland County Montour County Columbia County
22	POTTSVILLE Schuylkill County Carbon County Monroe County
23	HONESDALE-MILFORD Pike County Wayne County
24	TOWANDA Wyoming County Bradford County Sullivan County Tioga County
25	BRADFORD* Potter McKean Warren Forrest Cameron Elk
26	CLEARFIELD-DUBOIS* Jefferson County Clearfield
27	STATE COLLEGE - BELLEFONTE - PHILLIPSBURG* Clinton County Center County
28	OIL CITY-FRANKLIN Crawford County Venango County Clarion County
29	INDIANA Armstrong County Indiana County

*Airport served by major airlines.

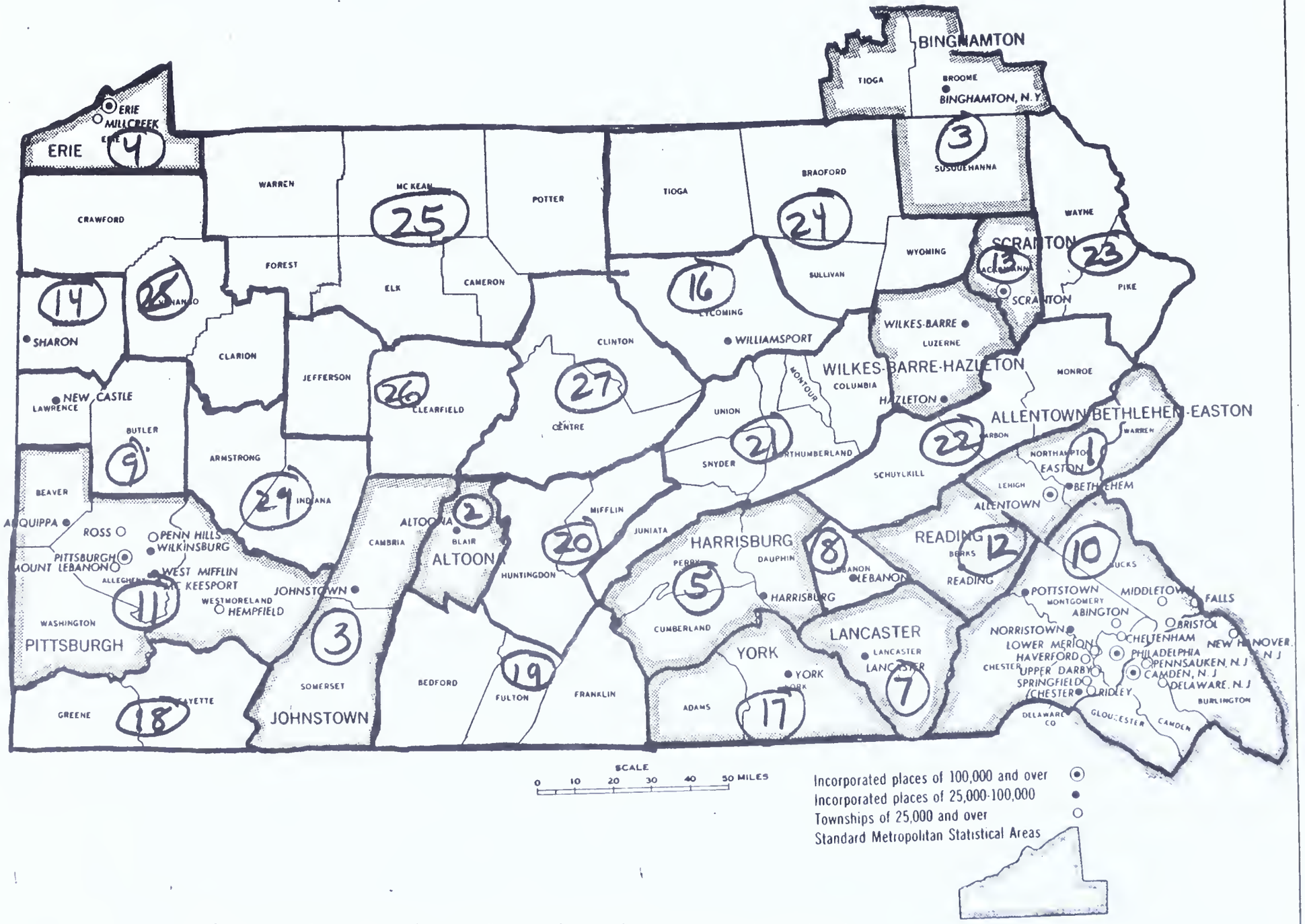


Figure 3-7 Tentative Nodes Selected for Demand Analysis

U.S. DEPARTMENT OF COMMERCE, Bureau of the Census, County and City Data Book, 1967

BUREAU OF THE CENSUS

out using groupings of MCD's to incorporate other significant population centers. This division will be compatible with the other major source of highway origin-destination data, besides the Edwards-Kelcey study, which is loadometer data which is based on a rectangular 4.8 x 7.8 grid system, Figure 3-8. (This grid can be most easily related to MCD's before aggregating into counties since the MCD/SLA is usually smaller.)

In summary, the nodes of Figure 3-7 will serve to analyze all nodes except highways, for which a more detailed breakdown of the counties in Table 3-2 will be used.[4]

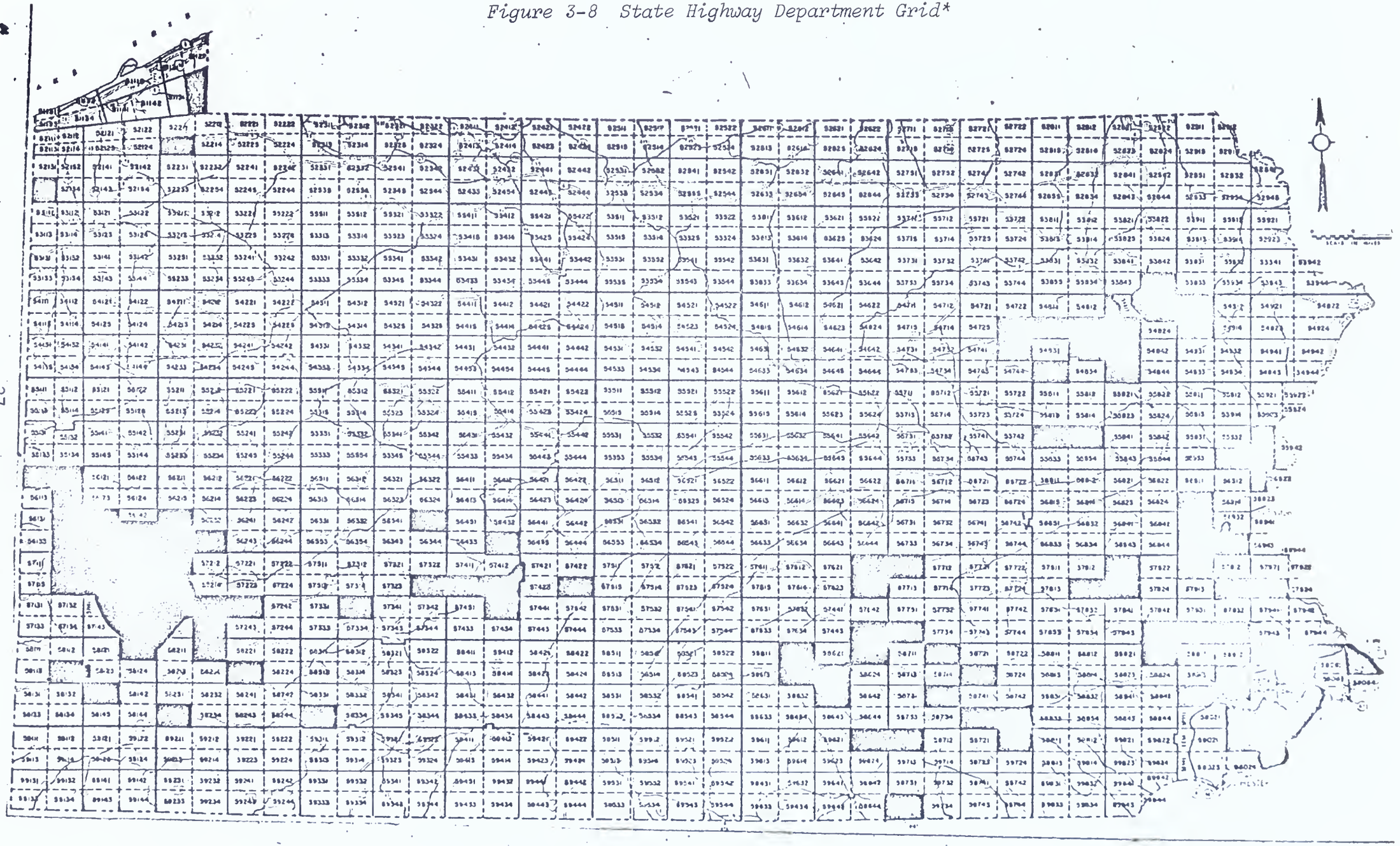
2. Non-Pennsylvania Nodes

Figure 3-9 and 3-10 show the areas comprising the Keystone and Northeast Corridors, respectively. Ideally, we would emphasize flows to population centers along these corridors. However, in studying the flow passengers and goods to and from nodes outside the Commonwealth, we are very much constrained by the available data.

The principal source of data for origins and destinations outside the Commonwealth is the 1963 Census of Transportation. Commodity flows were analyzed among the production Areas shown in Figure 3-11 and this breakdown limits the nodal detail obtainable for all rail, air, and water freight flows except insofar as we can get more information from CAB files of Air Freight Forwarders. Commodity flows covered by the ICC Waybills can be analyzed roughly on a state-by-state basis. Commodity flows for trucks sampled by the State Highway Department give (national) origin and destination information by County commodity. These data are available on punched cards and can be analyzed on this basis, although we will probably want to aggregate for comparison with the 1963 Census of Transportation.

Origin and Destination Statistics for air passengers have been kept historically so that we can get complete detail. Rail passenger flows will be limited to what can be obtained from the 1963 Census and from individual companies through Louis F. Klauder & Associates for the non-Pennsylvania nodes which they have defined. Automobile and auto passenger flows will be based on updating the Edwards-Kelcey study which used fourteen zones exterior to Pennsylvania[5], Figure 3-12. Insofar as bus flows are concerned,

*Figure 3-8 State Highway Department Grid**



*Ignore shaded areas.

E6663

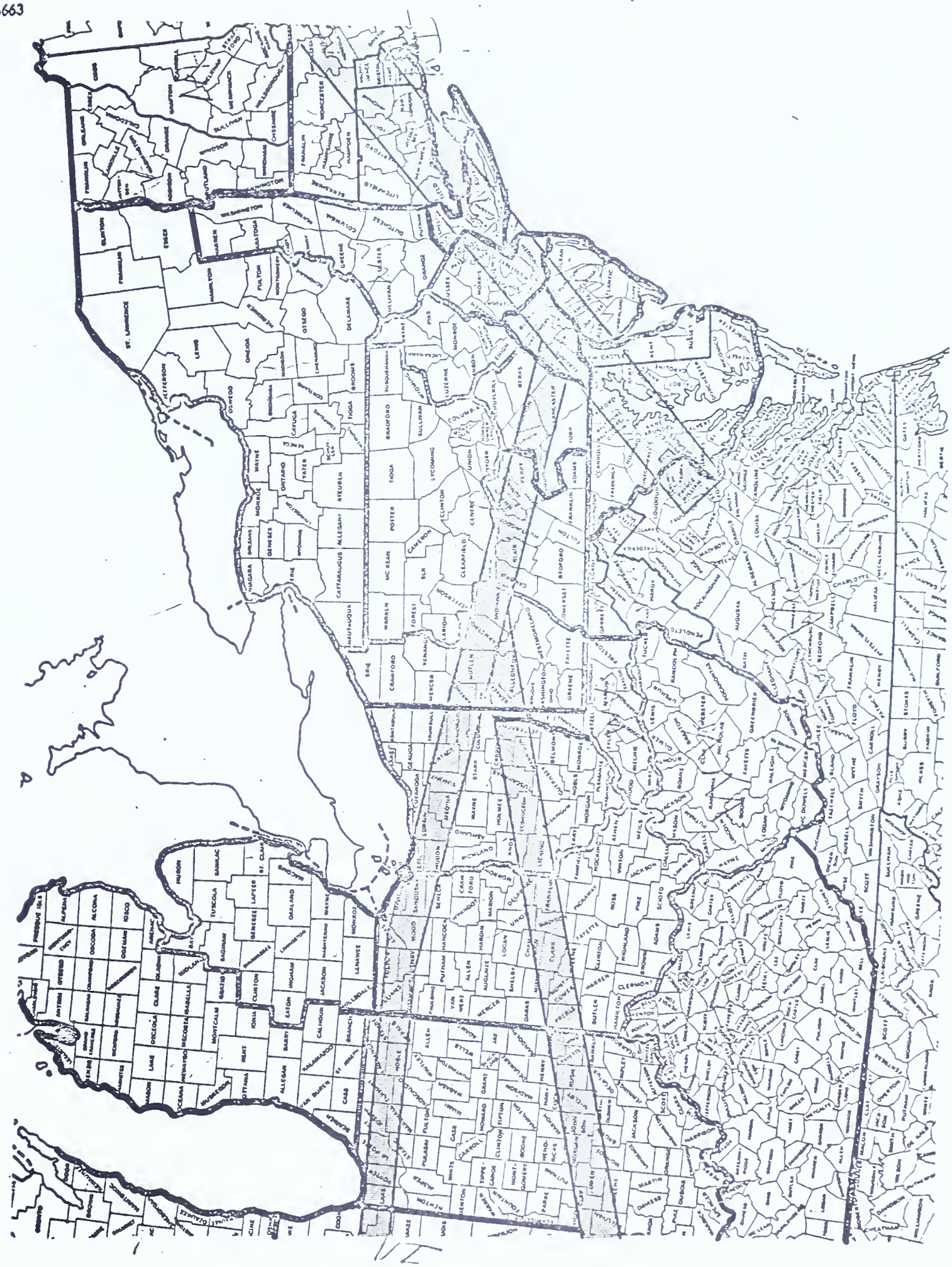
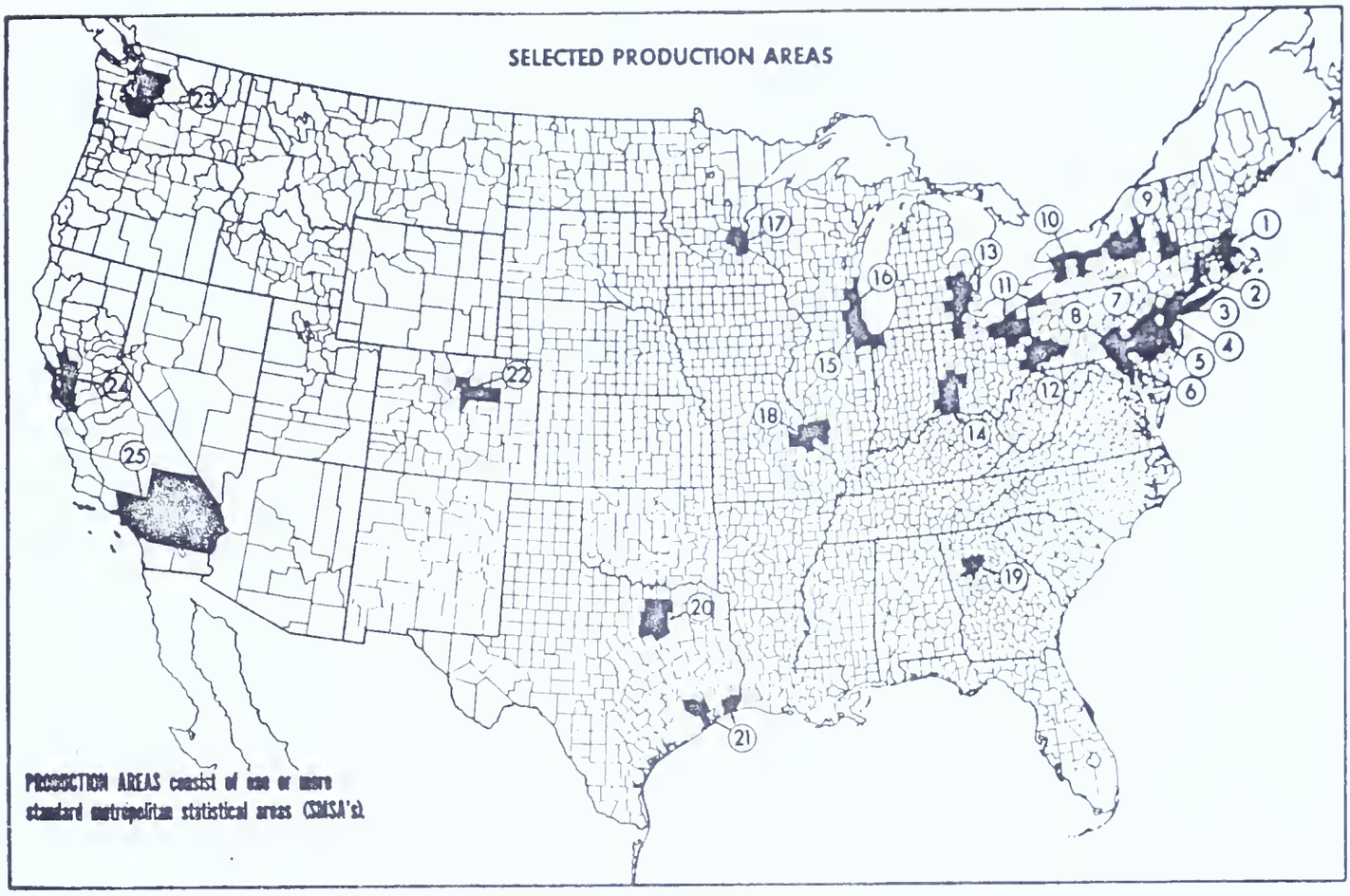


Figure 3-9 Keystone Corridor Origin-Destination Areas (WABCO)

Figure 3-10 BOUNDARIES OF THE NORTHEAST CORRIDOR AND CORRIDOR FRINGE.

(Heavy solid line indicates Corridor boundaries, heavy dashed line indicates Corridor Fringe boundaries, and heavy dotted lines indicate boundaries of Analysis Super-districts.)



DESCRIPTION OF PRODUCTION AREAS

In order to obtain useful "point-to-point" tabulations, the following production areas have been developed for this survey. These areas were selected to represent relatively compact geographic concentrations of manufacturing activity. Each consists of one or more standard metropolitan statistical areas (SMSA) which makes possible comparisons between traffic flow data and economic and demographic statistics available from other sources. The following list shows the production area number and its description (the SMSA's included in each area).

1. Boston, Mass.; Worcester, Mass.; Providence-Pawtucket-Warwick, R.I.-Mass.; Brockton, Mass.; Lawrence-Haverhill, Mass.-N.H.; and Lowell, Mass.
2. Hartford, Conn.; New Britain, Conn.; Meriden, Conn.; Waterbury, Conn.; New Haven, Conn.; Bridgeport, Conn.; Norwalk, Conn.; Stamford, Conn.; Springfield-Chicopee-Holyoke, Mass.-Conn.
3. New York, N.Y.
4. Newark, N.J.; Jersey City, N.J.; Paterson-Clifton-Passaic, N.J.; and Middlesex and Somerset counties, N.J.
5. Philadelphia, Pa.-N.J.; Wilmington, Del.-N.J.-Md.; Trenton, N.J.
6. Baltimore, Md.
7. Allentown-Bethlehem-Easton, Pa.-N.J.; and Reading, Pa.
8. Harrisburg, Pa.; Lancaster, Pa.; and York, Pa.
9. Syracuse, N.Y.; Utica-Rome, N.Y.; and Albany-Schenectady-Troy, N.Y.
10. Buffalo, N.Y.; and Rochester, N.Y.
11. Cleveland, Ohio; Akron, Ohio; Canton, Ohio; Lorain-Elyria, Ohio; Youngstown-Warren, Ohio; and Erie, Pa.
12. Pittsburgh, Pa.; Steubenville-Weirton, Ohio-W. Va.; and Wheeling, W. Va.-Ohio.
13. Detroit, Mich.; Flint, Mich.; Toledo, Ohio-Mich.; and Ann Arbor, Mich.
14. Cincinnati, Ohio-Ky.-Ind.; Dayton, Ohio; Hamilton-Middletown, Ohio; Springfield, Ohio.
15. Chicago, Ill.; and Gary-Hammond-East Chicago, Ind.
16. Milwaukee, Wis.; Kenosha, Wis.; and Racine, Wis.
17. Minneapolis-St. Paul, Minn.
18. St. Louis, Mo.-Ill.
19. Atlanta, Ga.
20. Dallas, Tex.; and Fort Worth, Tex.
21. Houston, Tex.; Beaumont-Port Arthur, Tex.; and Galveston-Texas City, Tex.
22. Denver, Colo.
23. Seattle-Everett, Wash.; and Tacoma, Wash.
24. San Francisco-Oakland, Calif.; Vallejo-Napa, Calif.; and San Jose, Calif.
25. Los Angeles-Long Beach, Calif.; Anaheim-Santa Ana-Garden Grove, Calif.; and San Bernardino-Riverside-Ontario, Calif.

30. All SMSA's not included in the 25 production areas above.
50. All points or places located outside of SMSA's.

Figure 3-11 Selected Production Areas - 1963 Census of Transportation

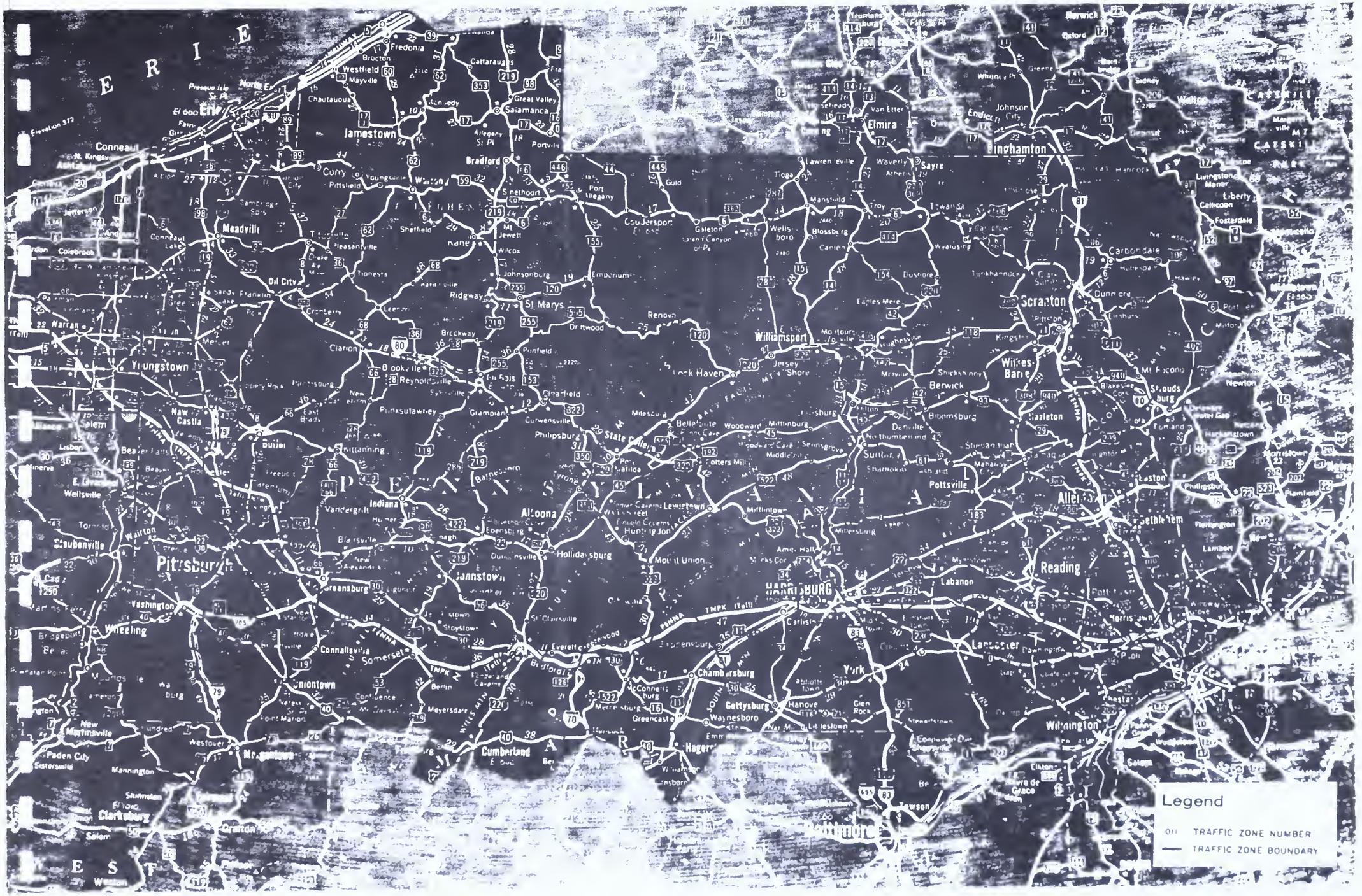


Figure 3-12 External:Internal Zones Used in Edwards-Kelcey Study

no source of data by node has been located. If data from individual companies is required, it will be obtained through Wilbur Smith & Associates.

Task 3 - Demand Analysis

The initial month of the demand analysis study has been devoted to a specification of the links and nodes to be studies and a search for data. The link and node selection has been discussed previously.

The following organizations have been contacted and/or visited:

Bureau of Labor Statistics, Department of Labor
Bureau of Economics, Department of Commerce
Census Bureau
Interstate Commerce Commission
Bureau of Public Roads
Civil Aeronautic Board
Federal Aviation Agency
Department of the Interior (Pipelines)
Corps of Engineers (waterborne commerce)
U.S. Maritime Administration
National Association of Motor Bus Owners
American Association of Railroads
American Trucking Association
American Association of Automobile Manufacturers
American Transportation Association
Pennsylvania Bell Telephone Company
Long Lines Department of AT&T
Westinghouse Air Brake Company (Melper Division)
Pennsylvania State Department of Highways
Pennsylvania State Planning Board
Department of Transportation, Mr. Shuldiner, Director
Northeast Corridor Studies
Allegheny Airlines
Pennsylvania Railroad Company
Atlantic Richfield Company
Oil and Gas Journal

As a result of these contacts, the current demand data base has been specified in large part. Some of the limitations have been discussed previously under the topic of node and link selection. Table 3-3 summarizes the Demand Analysis approach as it now stands, based on the results of the data search and the primary analytical techniques which can be used given the state of the data. It also outlines some specific problems that exist due to deficiencies in the data. Documents collected to date for the demand analysis study are listed in Appendix A.

It should be pointed out that the limitations of this study will be fully as important as the accomplishments. Problems of data acquisition which are wide spread in all studies of inter-city transportation demand will be compounded in this study by the constraint of time. It will, for example, be totally infeasible to undertake the collection of new data; almost total reliance has to be placed on readily available sources existing in published or punch-card form. The exceptions to this will be any company data which are collected early enough in the course of the infrastructure survey to be useful. This means that fully complete and exactly contemporary data will not be available. This is a particularly acute problem for forecasting intra-state demands. The reconstruction of data from adjustments of source information will add, sometimes substantially, to the degree of error already present in the diverse data samples.

An unhappy consequence of these data problems is the limitation imposed on the use of analytical techniques. For example, cross-sectional analyses will have to be employed in many instances in which it is impossible to reconstruct historical traffic movements. This means that changes in travel behavior, if any, that result from underlying trends in consumption preferences and patterns of business activity will not be identified and measured.

3. Links

One link for each node that is relevant will be constructed for each node-pair. This means that demand will be analyzed by mode between node pairs, even through several rail or bus lines may, for example, correct the nodes in question. To develop the facility requirements, the highway demand will be assigned to specific highways.

Table 3-3
Demand Analysis-Prospects and Problems

Prospects and Problems	Passengers				Freight				
	Auto	Bus	Rail	Air	Truck	Rail	Air	Water	Pipeline
1. Data Sources									
A. Primary	Edwards-Kelcey 1963 Census Villanova ADT Traffic Logs and Maps.	No intra-state data on common carriers outside of U.S. Census.	1963 Census.	Historic Origin Destination Surveys.	Loadometer Data* Edwards-Kelcey.	ICC Way bill O-D by state (ICC Way bill statistics give no consideration to how freight moves through states). 1963 Census by Production.	1963 Census Air Freight for warder O-D(cab). Tonnage. Emplaned (CAB). (No routine public statistics on air freight.)	Waterbourne Commerce. 1963 Census. No information is available by commodity of the origination characteristics of receipts nor of the termination of waterbourne shipments	ICC?
B. Secondary		Schedules plus company estimated load factors.	Company data obtained by Levis T. Klauder PRR†.			Company data obtained by Levis T. Klauder.	Airline data if obtained by R.L. Banks.		
2. Primary Analytical Approach	Update of EK 1975 projections using infrastructure utilization and Villanova regression approach.	Depends on data.	Depends on data. Can use aggregate data on Company historic trends to scale if nothing better.	Trend extrapolation.	Trend extrapolation.	Waybill trends. Allocate flows to state using economic indicators.	Cross-sectional. Depends on data availability.	Cross sectional Depends on data availability.	?
3. Units for Demand Forecast.	Auto trips/day. (Average & Peak) Scale to Annual Passenger-Miles.	Passengers/Day Buses/Day? Scale to Annual Passenger-Miles.	Passengers/Day Scale to Annual Passenger-Miles.	Passengers/Day Annual Passenger-miles (Distribution)	Trucks/Day. Tons-Year by Commodity-2 digit class (20-30 categories). Ton-Miles/Day. Annual Ton-Miles.	Tons/Day. 2 digit commodity. Ton-Miles/Day. Annual Ton-Miles.	Tons/Day (Gross). Tons/Miles. Annual Tons-Miles.	Tons/Day (Gross) Tons/Miles. Annual Ton-Miles.	Gal/Day/Product Gal/Yr/Product
4. Problems	Two basic time points for extrapolation.	Common carrier data. School bus data.	Lack of historic O-D data.	No anticipation of new roles. No projections for air taxis, general aviation by node.		Allocation of flows to nodes in state. state.	No commodity data. (historic).	Limited to port-to-port information.	Use special nodes.

* A special request will be necessary to get the cards duplicated in a short enough time for them to be useful.

† The Pennsylvania Railroad has a tape listing flows by commodity, origin, and destination but will not release it except for a very aggregated set of nodes.

b. Time Framework

The time horizon for the Interim Transportation Master Plan will be 1975 so that the impacts of new technology will be restricted.

c. Commodity Classification

Commodities will be classified insofar as data permits to not more than two digits.

d. Units of Measurement

Units of measurement are presented in Table 3-3 under Task 3, Demand Analysis.

Introduction

Members of the staff of the Transportation Research Center of The Pennsylvania State University and the Transportation Research Institute of Carnegie-Mellon University are engaged in a cooperative research effort to develop a viable methodology plan to implement comprehensive statewide planning in transportation. The Penn State effort is most closely associated with tasks delineated in the original proposal, viz, node allocation, link allocation, and land-use impact. In addition, Penn State has some responsibility for network simulation and the over-all methodological framework.

Organization and General Approach

Since the work on some of the tasks has to proceed simultaneously, the members of the staff of the Transportation Research Center have been organized in a manner to accomplish the stated tasks. At the outset it has been decided to separate passenger and freight for purposes of analysis. One member of the staff has been assigned the responsibility for examining the traditional urban area methodologies for handling passengers to see if they can be refined to handle movement of passengers on a regional basis. The responsibility for movement of freight has been subdivided into two tasks in accordance with the original proposal, i.e., line and node allocation. As stated elsewhere, the node allocation actually involves two tasks, viz, projection of demand and distribution of outputs among nodes. The link allocation aspect involves distribution movement among different modes of transportation.

Methodology Review

The transportation area has attracted the attention of numerous disciplines, e.g., economics, engineering, political science, regional analysis, psychology, sociology, agriculture, geography, etc. Many study efforts in recent years have been interdisciplinary in nature as is the case with the instant effort. However, there have been many independent efforts in various disciplines and a general "expolsion" in interest in transportation with consequent increase in publications.

The comprehensive and complex nature of the present study effort requires that as thorough a review as possible, under the time constraints of this project, be made in order to uncover and evaluate any efforts, concepts, or methodologies directly or indirectly related to our efforts. Such a review is presently under way by both faculty and graduate students and will continue for several more weeks. It should be mentioned that the annotated bibliography prepared for the Governor's Committee for Transportation will facilitate our efforts since it will significantly reduce our search efforts and increase our review and evaluation efforts. The level of achievement in this area thus far is reflected in our first working paper and also in a later section of this progress report.

Conceptual Formulation

As implied in the statement of task descriptions, an important facet of both link and node allocation is the conceptual framework for each. The level of realism achieved by the final "model" is to some extent contigent upon the efforts made in this area. In the Short Run Master Plan some compromises have to be made with available data in terms of defining and analyzing links and nodes. But in the efforts of Penn State and Carnegie-Mellon for the final methodology, a thorough analysis has to be done in this

area in order to allow the State to achieve a sophisticated set of models for planning.

In terms of the present conceptualization with regard to nodes, we are assuming that all the population and activity of a region surrounding a node is concentrated in that node. Since real activity and population is not concentrated at a node, but is more or less dispersed through the region, real activity requires transportation within the region. However, since the model assumes concentration at the node, the model will not be concerned with transportation within the area surrounding the node. Each node will be considered only as an exporter and importer of goods and services. The goods and services consumed out of internal production are not relevant to the model. The goods and services imported by a node constitute the "final demand" of that node. The exports of a node are the "supplies" of goods and services generated by that node.

In terms of link conceptualization, all basic modes of transportation have to be handled in some meaningful fashion and as indicated previously we have to handle what has traditionally been described as modal split. One important aspect of this is obviously cost analysis. Along these lines we have defined three concepts to allow us to handle the analysis:

(1) Cost Path - a method of transferring goods between any two nodes. Would include total cost to user, i.e., transport and nontransport costs. The cost path could involve segments at different modes of transport or segments of one mode. Since there are (N) number of "methods", the operational model would include only the present means of transport and those alternatives judged to be reasonable by a heuristic approach. The cost path would be spatially identifiable.

(2) Link - one or more cost paths, and since cost paths have a spatial dimension, links could be spatially identified.

(3) Segment - a part of cost path involving a specific route of a particular mode between two points (not necessarily nodes). A cost path may have one or more segments. Segments are employed in developing the transport elements of cost.

General Summary: Problems and Prospects

The working paper which was referred to above develops in some detail related efforts, but a brief comment would appear appropos here. There would appear to be three sources that are singularly more important than others to the instant study effort. First, there have been a number of comprehensive urban area studies which will be helpful. These studies help in the conceptualization aspects and also by having developed some viable methodologies that may be refined to provide some rough approximations for initial efforts. The urban area studies have dealt primarily with passengers which reduces the complexity of their efforts. For example, the modal split model would generally just have to handle public transit versus private auto. Whereas our efforts have to handle five modes of transportation. Since these studies have only handled passengers, they have usually used time variables exclusively in assigning passengers to a mode. With freight the problem is much more complex since time is only one factor that the user takes into consideration. This is also true with passengers in a regional model, i.e., time would be only one consideration.

The second source is the Northeast Corridor Project of the U.S. Department of Transportation. In many respects, the work that has been done in this area

is most beneficial to our project. The effort is regional in nature and is supposed to develop models to handle passengers and freight. The project has been underway for several years and so we have had the advantage of being able to examine their general appraoch as well as some of their publications which treat related topics. The Northeast Corridor Project has tended to emphasize passenger movements in their initial efforts and there has also been a lot of emphasis on "hardware" which is not germane to our efforts. They have several studies underway at the present time which would shed much light on some parts of our project, but their time horizon is longer than ours. In spite of the obvious differences between our efforts and those of the Northeast Corridor Project, their work will enhance our final output.

A third source is the study done for the State of California by the North American Aviation Company. This effort is quite analogous to ours since it is also a study design. Although the California study will provide some meaningful insights, our general appraoch differs from theirs and their efforts leave something to be desired in terms of plans for methodology development and their over-all framework.

As implied in our task statement, one of the methodology problems we are working with at present is how to handle socio-economic impact. The Northeast Corridor people are probably going to handle impact in a separate model and in fact are working on two impact models -- one for large regions and one for small regions. At present, we are considering the possibility of developing a plan to handle "impact" in the node or demand model.

Finally, it should be noted that although there are a number of efforts which will provide aide in accomplishing the goals of this project, the effort involved herein is still quite unique and is pushing the frontiers of knowledge.

Meetings

Contact has been made with the Northeast Corridor Project staff, and they have promised to make available some of their internal working papers. In addition, contact was made with the Pennsylvania Department of Highways to discuss their related research efforts. Meetings have also been held with Carnegie-Mellon and FIRL as previously discussed under Task 1.

APPENDIX A

INDEX AND BIBLIOGRAPHY OF DOCUMENTS FOR PENNSYLVANIA TRANSPORTATION STUDIES[1]

by Sue S. Johnson

Sources are arranged according to the numberical designation described in the key shown below. Private research organizations and companies were contacted only when the document was not available through a Federal, State, or local governmental agency.

Key

1-19 - Federal Government Agencies
20-29 - National Trade Associations
30-79 - Research Organizations and Companies
80-99 - Universities
100-199 - Pennsylvania Government Agencies
200-299 - Non-Federal, Non-Pennsylvania Governmental Agencies
300- - Articles and Books

Some sources are listed in the index for which no documents are shown. This means that publications have been requested, but not yet received.

All documents listed in this bibliography can be obtained from

Miss Patricia Ferry
The Franklin Institute Research Laboratories
20th & Benjamin Franklin Parkway
Philadelphia, Pennsylvania 19103
Telephone 215-448-1252

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Index

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- 1.1 Bureau of the Census
- 1.2 Office of Business Economics
- 1.3 Maritime Administration
- 1.4 National Bureau of Standards
- 1.5 Clearinghouse for Federal Scientific and Technical Information

2.0 Department of Transportation

- 2.1 Federal Aviation Administration
- 2.2 Federal Highway Administration
  - 2.2.1 Bureau of Public Roads
- 2.3 Federal Railroad Administration
  - 2.3.1 Office of High Speed Ground Transportation
    - 2.3.1.1 Northeast Corridor Project

3.0 Civil Aeronautics Board

4.0 Interstate Commerce Commission

5.0 Federal Communications Commission

6.0 Federal Power Commission

7.0 Department of Defense

- 7.1 Department of the Army
  - 7.1.1 Corps of Engineers

8.0 Department of Labor

- 8.1 Bureau of Labor Statistics

9.0 Department of Agriculture

- 9.1 Agricultural Research Service
  - 9.1.1 Consumer and Food Economics Research Division
- 9.2 Economic Research Service
  - 9.2.1 Natural Resource Economics Division

10.0 Department of the Interior

- 10.1 Bureau of Outdoor Recreation
- 10.2 Office of Oil and Gas
- 10.3 Geological Survey

11.0 Department of Health, Education, and Welfare - None

- 11.1 Office of Education
  - 11.1.1 National Center for Educational Statistics
- 11.2 National Center for Health Statistics
- 1

12.0 Department of Housing and Urban Development - None

13.0 Department of the Treasury

- 13.1 Internal Revenue Service - None

14.0 Department of Justice - None

15.0 Department of State - None

16.0 Post Office Department - None

17.0 National Aeronautics and Space Administration - None

18.0 National Academy of Sciences

- 18.1 National Research Council

19.0 Federal Reserve Board

20.0 Transportation Association of America

21.0 Air Transport Association of America

22.0 Association of American Railroads

23.0 American Trucking Association

24.0 National Association of Motor Bus Owners

25.0 Automobile Manufacturers Association

26.0 Railway Systems and Management Association

30.0 National Planning Association

31.0 Batelle Memorial Institute

32.0 Stanford Research Institute

33.0 The RAND Corporation

34.0 Lockheed Aircraft Corporation

35.0 CONSAD

36.0 Port Authority of New York

37.0 Tri-State Transportation Commissions

38.0 Westinghouse Air Brake Company

80.0 Pennsylvania State University

81.0 University of Washington

82.0 University of Michigan

83.0 Northwestern University

84.0 Carnegie Institute of Technology

85.0 University of Oregon

86.0 Arizona State University

87.0 Texas A & M

88.0 Portland State College

89.0 East Virginia University

90.0 Massachusetts Institute of Technology

91.0 University of California - Berkley

92.0 University of California - Los Angeles

100.0 Pennsylvania State Planning Board

101.0 Department of Internal Affairs

102.0 Department of Highways

200.0 Appalachian Regional Commission

201.0 Pittsburgh Area Transportation Study

202.0 Connecticut Department of Highways

203.0 Massachusetts Department of Public Works

204.0 Industrial College of the Armed Forces

205.0 Southeastern Pennsylvania Transportation Association

1.0 DEPARTMENT OF COMMERCE

1.1 Bureau of the Census
Federal Office Bldg. No. 3
Suitland, Maryland
301-440-7203 - General
301-735-2000 Ext. 314 - Publications

1.1.1 General and Miscellaneous

1.1.1.1 *Statistical Abstract of the United States 1967**

1.1.1.2 *County and City Data Book 1967** (Available on IBM 1401 tape for $3.00 plus shipping).

1.1.1.3 *Historical Statistics of the United States: Colonial Times to 1957**

1.1.1.4 *Historical Statistics of the United States: Continuation to 1962 and Revisions**

1.1.1.5 *Directory of Federal Statistics for Local Areas: A Guide to Sources 1966**

1.1.1.6 *Raw Materials in the United States Economy: 1900-1961**

Also Censuses and Surveys of Population HH - Series.

Population Redistribution and Economic Growth[1]

1.1.2 County Business Patterns 1966**

1.1.2.1 Pennsylvania CBP-66-40

1.1.2.2 Virginia CBP-66-48

1.1.2.3 Connecticut CBP-66-8

1.1.2.4 Rhode Island CBP-66-41

1.1.2.5 Massachusetts CBP-66-23

1.1.2.6 New Hampshire CBP-66-31

1.1.2.7 Delaware CBP-66-9

1.1.2.8 New Jersey CBP-66-32

1.1.2.9 West Virginia CBP-66-50

1.1.2.10 Ohio CBP-66-37

1.1.2.11 Maryland CBP-66-22

1.1.2.12 New York CBP-66-34

1. Not purchased. Listed as general sources to provide more complete coverage of demographic data.

1.1.3 1963 Census[1] of Business**

1.1.3.1 Selected Services: Employment Size BC63-SS3

1.1.3.2 Selected Services: Single Units and Multiunits BC63-SS4

1.1.3.3 Selected Services: Legal Form of Organization BC63-SS5

1.1.3.4 Selected Services: Pennsylvania BC63-SA40

1.1.3.5 Wholesale Trade: Commodity Line Sales BC63-WS8

1.1.3.6 Wholesale Trade: Pennsylvania BC63-WA40

1.1.3.7 Retail Trade: Pennsylvania BC63-RA40 Revised

1.1.3.8 Retail Trade: Merchandise Line Sales: Middle Atlantic Sales: New Jersey, New York, Pennsylvania BC63-RS57C

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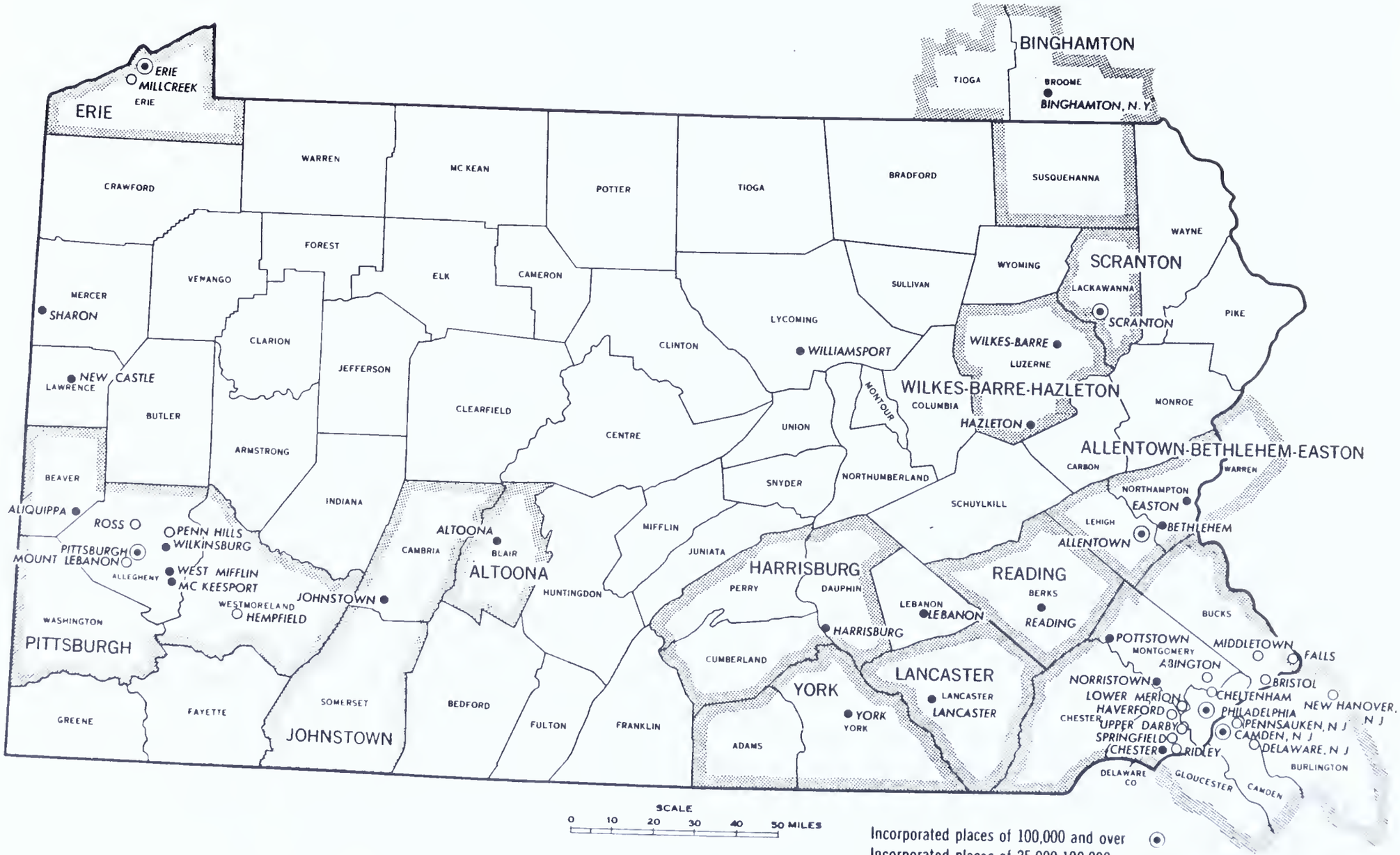
1. The 1963 Census of Business Reports comprise seven volumes:
   Vols. I, II, III - Retail Trade
   Vol. I - Retail Trade: Summary Statistics. BC63-RS
   Vol. II - Retail Trade: Area Statistics. BC63-RA series
   Vol. III - Major Retail Center Statistics. BC63-MRC series
   Vols. IV, V - Wholesale Trade
   Vol. V - Wholesale Trade: Summary Statistics. BC63-WS
   Vol. VI - Wholesale Trade: Area Statistics. BC63-WA series
   Vols. VI, VII - Selected Services
   Vol. VI - Selected Services: Summary Statistics. BC63-SS series
   Vol. VII - Selected Services: Area Statistics. BC63-SA series
   See map following for areas of Pennsylvania covered in area reports.



PENNSYLVANIA

1.1.4 1964 Census[1] of Agriculture**

1.1.4.1 Pennsylvania Vol. 1, Part 9.

1.1.5 United States Census[2] of Housing 1960**

1.1.5.1 Middle Atlantic Division: Metropolitan Housing HC (2) No. 3

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1. The 1964 Census of Agriculture comprises the three volumes:
   Preliminary Reports. For Each county and state.
   Vol. I - State and County Statistics
   Vol. II - General Report
   Vol. III - Special Reports
2. The 1960 Census of Housing comprises the following reports:
   Vol. I - States and Small Areas. Series HC (1)
   Vol. II - Metropolitan Housing. Series HC (2)
   Vol. III - City Blocks. Series HC (3)
   Vol. IV - Components of Inventory Change. Series HC (4)
   Vol. V - Residential Finance, Parts 1 and 2.
   Vol. VI - Rural Housing.
   Vol. VII - Housing of Senior Citizens
   Census Tracts. Series PHC (1)
   Special Reports for Local Housing Authorities Series HC (S1)

See attached page for list of Pennsylvania areas covered in area reports.

LIST OF SERIES HC(2) REPORTS

[Reports for the United States and divisions provide statistics for the total area, inside SMSA's, and outside SMSA's. In the list of SMSA's, an asterisk (*) denotes reports which contain separate statistics for places of 100,000 inhabitants or more]

1. United States

Divisions

2. New England
3. Middle Atlantic
4. East North Central
5. West North Central
6. South Atlantic
7. East South Central
8. West South Central
9. Mountain
10. Pacific

Standard Metropolitan Statistical Areas

11. Abilene, Tex.
12. Akron, Ohio*
13. Albany–Schenectady–Troy, N.Y.*
14. Albuquerque, N. Mex.*
15. Allentown–Bethlehem–Easton, Pa.–N.J.*
16. Altoona, Pa.
17. Amarillo, Tex.*
18. Ann Arbor, Mich.
19. Asheville, N.C.
20. Atlanta, Ga.*
21. Atlantic City, N.J.
22. Augusta, Ga.–S.C.
23. Austin, Tex.*
24. Bakersfield, Calif.
25. Baltimore, Md.*
26. Baton Rouge, La.*
27. Bay City, Mich.
28. Beaumont–Port Arthur, Tex.*
29. Binghamton, N.Y.
30. Birmingham, Ala.*
31. Boston, Mass.*
32. Bridgeport, Conn.*
33. Brockton, Mass.
34. Brownsville–Harlingen–San Benito, Tex.
35. Buffalo, N.Y.*
36. Canton, Ohio*
37. Cedar Rapids, Iowa
38. Champaign–Urbana, Ill.
39. Charleston, S.C.
40. Charleston, W. Va.
41. Charlotte, N.C.*
42. Chattanooga, Tenn.–Ga.*
43. Chicago, Ill.*
44. Cincinnati, Ohio–Ky.*
45. Cleveland, Ohio*
46. Colorado Springs, Colo.
47. Columbia, S.C.
48. Columbus, Ga.–Ala.*
49. Columbus, Ohio*
50. Corpus Christi, Tex.*
51. Dallas, Tex.*
52. Davenport–Rock Island–Moline, Iowa–Ill.
53. Dayton, Ohio*
54. Decatur, Ill.
55. Denver, Colo.*
56. Des Moines, Iowa*
57. Detroit, Mich.*
58. Duluth–Superior, Minn.–Wis.*
59. Durham, N.C.
60. El Paso, Tex.*
61. Erie, Pa.*
62. Eugene, Oreg.
63. Evansville, Ind.–Ky.*
64. Fall River, Mass.–R.I.
65. Fargo–Moorhead, N. Dak.–Minn.
66. Flint, Mich.*
67. Fort Lauderdale–Hollywood, Fla.
68. Fort Wayne, Ind.*
69. Fort Worth, Tex.*
70. Fresno, Calif.*
71. Galveston–Texas City, Tex.
72. Gary–Hammond–East Chicago, Ind.*
73. Grand Rapids, Mich.*
74. Green Bay, Wis.
75. Greensboro–High Point, N.C.*
76. Greenville, S.C.
77. Hamilton–Middletown, Ohio
78. Harrisburg, Pa.
79. Hartford, Conn.*
80. Honolulu, Hawaii*
81. Houston, Tex.*
82. Huntington–Ashland, W. Va.–Ky.–Ohio
83. Huntsville, Ala.
84. Indianapolis, Ind.*
85. Jackson, Mich.
86. Jackson, Miss.*
87. Jacksonville, Fla.*
88. Jersey City, N.J.*
89. Johnstown, Pa.
90. Kalamazoo, Mich.
91. Kansas City, Mo.–Kans.*
92. Kenosha, Wis.
93. Knoxville, Tenn.*
94. Lake Charles, La.
95. Lancaster, Pa.
96. Lansing, Mich.*
97. Las Vegas, Nev.
98. Lawrence–Haverhill, Mass.–N.H.
99. Lexington, Ky.
100. Lima, Ohio
101. Lincoln, Nebr.*
102. Little Rock–North Little Rock, Ark.*
103. Lorain–Elyria, Ohio
104. Los Angeles–Long Beach, Calif.*
105. Louisville, Ky.–Ind.*
106. Lowell, Mass.
107. Lubbock, Tex.*
108. Lynchburg, Va.
109. Macon, Ga.
110. Madison, Wis.*
111. Memphis, Tenn.*
112. Miami, Fla.*
113. Milwaukee, Wis.*
114. Minneapolis–St. Paul, Minn.*
115. Mobile, Ala.*
116. Monroe, La.
117. Montgomery, Ala.*
118. Muncie, Ind.
119. Muskegon–Muskegon Heights, Mich.
120. Nashville, Tenn.*
121. Newark, N.J.*
122. New Bedford, Mass.*
123. New Britain, Conn.
124. New Haven, Conn.*
125. New London–Groton–Norwich, Conn.
126. New Orleans, La.*
127. Newport News–Hampton, Va.*
128. New York, N.Y.*
129. Norfolk–Portsmouth, Va.*
130. Ogden, Utah
131. Oklahoma City, Okla.*
132. Omaha, Nebr.–Iowa*
133. Orlando, Fla.
134. Paterson–Clifton–Passaic, N.J.*
135. Pensacola, Fla.
136. Peoria, Ill.*
137. Philadelphia, Pa.–N.J.*
138. Phoenix, Ariz.*
139. Pittsburgh, Pa.*
140. Portland, Maine
141. Portland, Oreg.–Wash.*
142. Providence–Pawtucket, R.I.–Mass.*
143. Provo–Orem, Utah
144. Pueblo, Colo.
145. Racine, Wis.
146. Raleigh, N.C.
147. Reading, Pa.
148. Richmond, Va.*
149. Roanoke, Va.
150. Rochester, N.Y.*
151. Rockford, Ill.*
152. Sacramento, Calif.*
153. Saginaw, Mich.
154. St. Louis, Mo.–Ill.*
155. Salt Lake City, Utah*
156. San Antonio, Tex.*
157. San Bernardino–Riverside–Ontario, Calif.
158. San Diego, Calif.*
159. San Francisco–Oakland, Calif.*
160. San Jose, Calif.*
161. Santa Barbara, Calif.
162. Savannah, Ga.*
163. Scranton, Pa.*
164. Seattle, Wash.*
165. Shreveport, La.*
166. Sioux City, Iowa
167. South Bend, Ind.*
168. Spokane, Wash.*
169. Springfield, Ill.
170. Springfield, Mo.
171. Springfield, Ohio
172. Springfield–Chicopee–Holyoke, Mass.*
173. Stamford, Conn.
174. Steubenville–Weirton, Ohio–W. Va.
175. Stockton, Calif.
176. Syracuse, N.Y.*
177. Tacoma, Wash.*
178. Tampa–St. Petersburg, Fla.*
179. Terre Haute, Ind.
180. Toledo, Ohio*
181. Topeka, Kans.*
182. Trenton, N.J.*
183. Tucson, Ariz.*
184. Tulsa, Okla.*
185. Tuscaloosa, Ala.
186. Utica–Rome, N.Y.*
187. Waco, Tex.
188. Washington, D.C.–Md.–Va.*
189. Waterbury, Conn.*
190. Waterloo, Iowa
191. West Palm Beach, Fla.
192. Wheeling, W. Va.–Ohio
193. Wichita, Kans.*
194. Wichita Falls, Tex.*
195. Wilkes-Barre–Hazleton, Pa.
196. Wilmington, Del.–N.J.
197. Winston-Salem, N.C.*
198. Worcester, Mass.*
199. York, Pa.
200. Youngstown–Warren, Ohio*
201. Ponce, P.R.*
202. San Juan, P.R.*

1.1.6 1963 Census of Transportation**

1.1.6.1 Passenger Transportation Survey Vol. I

Presents data on national travel and home-to-work commuting. On national travel, data are shown for trips, travelers, and traveler nights, by such characteristics as means of transportation, purpose, duration, distance of trip, size of party, and lodgings used. Also presented are data on travel frequency of households and persons by socio-economic status factors and travel characteristics listed above. On home-to-work travel, data are furnished on such items as means of transportation, distance to work, time required to get to work, availability of public transportation, and selected socio-economic status characteristics of workers.

1.1.6.2 Truck Inventory and Use Survey Vol. II

Data based on a probability sample of trucks in the 50 States and the District of Columbia on the characteristics and uses of the Nation's truck resources. Data in most tables are expressed in percent distributions and cover various characteristics related to annual mileage, annual use, annual vehicle miles, area of operation, body type, driver man-hours, load length or capacity, maintenance responsibiliby, major use, size class, truck fleets, number of trucks, type of fuel used, weekly use, year of model.

1.1.6.3 Commodity Transportation Survey Vol. III

Parts 1 and 2 - Commodity Groups

Statistics on the flow of commodities grouped in terms of the transportation commodity classification (TCC). Data for tons and ton-miles of shipments, by means of transport, length of haul, weight, origin, and destination are shown in Part 1, for 2-, 3-, 4-, and 5-digit TCC levels and, in Part 2, for selected groupings of commodities on the 3-digit level.

Part 3 - Shipper Groups

Data on tons and ton-miles of commodities shipped by manufacturing establishments in each of 24 major shipper groups, classified by means of transport, length of haul, origin, destination, commodity, and size of plant.

Part 4 - Production Areas

Data on the flow of commodities from manufacturing plants located in each of 25 production areas (each area consists of one or a cluster of standard metropolitan statistical areas). Data are shown for tons and ton-miles of commodities shipped classified by weight, means of transport, length of haul, and destination.

1.1.6.4 Motor Carrier Survey Vol. IV

Data on the operation of bus carriers and "for hire" truck carriers not subject to the regulations of the Interstate Commerce Commission. Subjects covered include form of ownership, expenses, operating revenues, and principal type of service.

1.1.7 1963 Census of Manufactures[1]

1.1.7.1 Pennsylvania (not yet obtained)

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1. The 1963 Census of Manufactures comprises the following reports:
   Vol. I - Summary Statistics. Series MC63 (1)
   Series MC63 (1)-6. Power Equipment in Manufacturing Industries as of December 31, 1962.
   Series MC63 (1)-7. Fuels and Electric Energy Consumed in Manufacturing Industries.
   Vol. III - Area Statistics. Series MC63 (3)
   Supplementary Reports. Series MC63 (S)-3.1 to -3.9. Location of Manufacturing Plants by Industry, County, and Employment Size. Series MC63 (S)-4.1 to -4.9. Location of Manufacturing Plants by County, Industry, and Employment Size.
   Series M161 (63)-1. Survey of the Origin of Exports of Manufactured Products. (Irregular)
   Series M64 (AS). Annual Survey of Manufactures: 1964.

1.1.8 Current Population Reports

1.1.8.1 *Consumer Income**

1.1.8.1.1 "Average Family Income Up 5 Percent in 1964" Series P-60, No. 44, May 27, 1965. Advance Report.

1.1.8.1.2 "Income in 1964 of Families and Persons in the United States" Series P-60, No. 47, September 24, 1965.

1.1.8.1.3 "Median Family Income Up About 5 Percent in 1965" Series P-60, No. 49, August 10, 1966. Advance Report.

1.1.8.1.4 "Income in 1965 of Families and Persons in the United States" Series P-60, No. 51, January 12, 1967.

1.1.8.1.5 "Average Family Income Up 7 Percent in 1966" Series P-60, No. 52, August 21, 1967. Advance Report.

1.1.8.2 Population Estimates

1.1.8.2.1 "Estimates of the Population of States: July 1, 1964 with Provisional Estimates for July 1, 1965" Series P-25, No. 324, January 20, 1966.

1.1.8.2.2 "Estimates of the Population of States: July 1, 1965 with Provisional Estimates for July 1, 1966" Series P-25, No. 348, September 16, 1966.

1.1.8.2.3 "Estimates of the Population of Standard Metropolitan Statistical Areas: July 1, 1965 with Estimates for Metropolitan Counties and Components of Population Change: 1960 to 1965" Series P-25, No. 371, August 14, 1967.

1.1.8.2.4 "Illustrative Projections of the Population of States: 1970 to 1985" Series P-25, No. 326, February 7, 1966.

1.1.8.2.5 "Illustrative Projections of the White and Non-White Population of the United States, By Age and Sex to 1985" Series P-25, No. 345, July 29, 1966.

1.1.8.2.6 "Projections of the Population of the United States by Age and Sex: 1964 to 1985 with Extensions to 2010" Series P-25, No. 286, July, 1964. Jacob S. Siegel, et. al.

1.2 Office of Business Economics
1832 M Street
Washington, D. C.
202-ST-3-9200 Ext. 4550 - Publications

1.2.1 *Growth Patterns in Employment by County 1940-1950 and 1950-1960. Vol. 2 Mideast.

1.2.2 Survey of Current Business. Monthly. Obtain from Library.

1.2.3 *Personal Income by States, 1929-1955.

1.3 Maritime Administration
441 G Street, N.W.
Washington, D. C. 20235
202-386-4973

1.3.1 "The Economic Impact of United States Ocean Ports"

1.4 National Bureau of Standards
Washington, D. C. 20234 (Mailing)
Located: Gaithersburg, Maryland
301-921-2318

1.4.1 Northeast Corridor Simulation. Contacts to be made.

Abe Karp
Bud Levin recommended by Paul Shuldiner
Lew Santone

Ed Cushin - recommended by Al Blumstein

1.5 Clearinghouse for Federal Scientific and Technical Information
5285 Port Royal Road
Springfield, Virginia 22151
703-321-8500 - Ask for Sales Office

1.5.1 *Demand for Intercity Passenger Travel in the Washington-Boston Corridor. Systems Analysis and Research Corporation. Boston, Massachusetts. PB 166 884.

1.5.2 *Studies in Travel Demand. Ronald E. Miller et. al. Mathematica. Princeton, New Jersey. September, 1965. PB 173 499.

1.5.3 *Intercity Freight Transportation Requirements of the Washington-Boston Corridor in 1980. United Research, Inc. Cambridge, Massachusetts. November, 1963. PB 166 885.

1.5.4 *Social Factors Associated With Traffic Generation in a Metropolitan Area of 75,000 Population. Robert W. Janes. University of Illinois, Urbana, Illinois. April, 1966. PB 174 475.

1.5.5 *Future U.S. Transportation Needs. A.H. Norling. United Research, Inc. Cambridge, Massachusetts. 1963. N64 25006.

1.5.6 *Highway Travel in Washington, New York, Boston, Megalopolis. Wilbur Smith and Associates. 1963. PB 166 881.

1.5.7 *Forecasting Techniques for Determining the Potential Demand for Highways. Robert W. Patterson. Missouri University, Columbia, Missouri. 19 April 1966. PB 174 410.

1.5.8 *A Systems Analysis of Short Haul Air Transportation, Part III. Massachusetts Institute of Technology. Cambridge, Massachusetts. August, 1965. PB 169 521.

1.5.9 *Feasibility and Cost of Expanded Intercity Air Service in the Washington-Boston Corridor. Systems Analysis and Research Corporation. Boston, Massachusetts. PB 166 883.

1.5.10 *An Economic Analysis of Commercial VTOL and STOL Transport Aircraft. Richard K. Waldo, et. al., Stanford Research Institute, Menlo Park, California. February, 1965. AD 614 598.

1.5.11 *STOL-VISTOL City Center Transport Aircraft Study. McDonnell Aircraft Corporation. 10 October 1964. AD 614 585.

1.5.12 *Feasibility of Developing Dollar Values for Increments of Time Saved by Air Travelers. Systems Analysis and Research Corporation. Cambridge, Massachusetts. February, 1966. PB 169 878.

1.5.13 *Washington-Boston Transportation Study, Part B. Feasibility and Cost of Improved Railroad Service. Andrew A. Arentz, Jr., et. al., General American Transportation Corporation. Niles, Illinois. November, 1963. PB 166 886.

1.5.14 †High-Speed Railroad Operations Within the New York Metropolitan Area in Connection with High-Speed Service Between Washington, D. C. and Boston, Massachusetts. S. H. Bingham, Consulting Engineers and Architects. New York, New York. November, 1963. PB 166 887.

1.5.15 †Supplemental Report on Improvements to Railroad and Passenger Service Between New York and Washington. Louis T. Klauder and Associates. Philadelphia, Pennsylvania. 12 June 1964. PB 166 880.

1.5.16 †Preliminary Engineering Report on Possible Improvements to Railroad Passenger Service Between New York and Washington. Louis T. Klauder. Louis T. Klauder and Associates. Philadelphia, Pennsylvania. June 1, 1964. PB 166 879.

1.5.17 †*U.S. Passenger Transportation: An Inventory of Resources and an Analysis of Capabilities of Surface Modes. Stanford Research Institute. Menlo Park, California. March, 1967. Ad 655 567.

1.5.18 †Technology for High-Speed Ground Transport. William W. Seifert, et. al., Massachusetts Institute of Technology. Cambridge, Massachusetts. 31 December 1966. PB 173 658.

1.5.19 †Science and Technology in the Railroad Industry. National Research Council. Washington, D. C. August, 1963. PB 166 882.

1.5.20 †Research and Development for High-Speed Ground Transportation. Report of the Panel on High-Speed Ground Transportation Convened by the Commerce Technical Advisory Board. March, 1967. PB 173 911.

1.5.21 †A Projection of Technology Applicable to the Future Highway System of the Boston-Washington Corridor. Cornell University. Buffalo, New York. 20 October 1964. PB 166 878.

1.5.22 *Intermodal Freight Transportation Coordination: Problems and Potential. Merrill J. Roberts and Associates. University of Pittsburgh. Pittsburgh, Pennsylvania. December, 1966. PB 173-862.

1.5.23 *Operating Cost Estimates for Long-Haul Sub-Sonic Jet Aircraft. Ann G. Harvey, et. al., Planning Research Corporation. Los Angeles, California. 11 February, 1966. PB 170 691.

1.5.24 *Cost-Based Freight Rates: Desirability and Feasibility. Systems Analysis and Research Corporation. Cambridge, Massachusetts. PB 173 209.

1.5.25 *Pennsylvania-Jersey Transportation Study. Volume I - The State of the Region. 1964. PB 173 327.

1.5.26 *Pennsylvania-Jersey Transportation Study. Volume II - 1975 Projections, Foreground of the Future. Pennsylvania Department of Highways. 1964. PB 173 326.

1.5.27 *Pennsylvania-Jersey Transportation Study. Volume III - 1975 Transportation Plans. Pennsylvania Department of Highways. 1965. PB 173 330.

1.5.28 *A Program for Comprehensive Planning and Development in National Capital Region. Harold Franklin Wise, Planning Consultant. December 15, 1965. PB 169 904.

1.5.29 *Literature Survey on the Command-Control of High-Speed Ground Oriented Transportation System. Hughes Aircraft Company. Fullerton, California. March, 1966. PB 170 561.

1.5.30 †Bay Area Transportation Study Commission. Information System: Data Description and Documentation. Joel M. Kibbee, et. al., System Development Corporation. Santa Monica, California. 22 December 1965. PB 169 555.

1.5.31 *Design for Impact Studies - Northeast Corridor Transportation Project. CONSAD Research Corporation. Pittsburgh, Pennsylvania. August, 1965. PB 173 484.

1.5.32 †TRANSIM - General Purpose Transportation System Simulator-User's Manual. University of California, Los Angeles, California. May, 1966. PB 173 016.

1.5.33 †TRANSIM - Card Deck. PB 173 017.

2.0 DEPARTMENT OF TRANSPORTATION

2.1 Federal Aviation Administration

800 Independence Avenue, S.W.
Washington, D. C. 20553
202-962-7777
Contact: Publications Office, Miss Roper, 202-962-5249, Room 930.

2.1.1 Eighth Annual Report. Fiscal Year 1966**

2.1.2 FAA Statistical Handbook of Aviation. 1965 Edition**

2.1.3 FAA Statistical Handbook of Aviation. 1966 Edition**

2.1.4 Direct Operating Costs and Other Performance Characteristics of Transport Aircraft in Airline Service. Calendar Year 1965. Office of Policy Development, Economics Division. September, 1966. AD-640-678††

2.1.5 Airport Activity Statistics of Certificated Route Air Carriers. 12 Months Ended June 30, 1964**

2.1.6 Airport Activity Statistics of Certificated Route Air Carriers. 12 Months Ended June 30, 1965**

2.1.7 Airport Activity Statistics of Certificated Route Air Carriers. 12 Months Ended June 30, 1966**

2.2 Federal Highway Administration

2.2.1 Bureau of Public Roads
Contact: Publications Office, Mrs. Kelly
Donaho Bldg., Room 534
6th and D Street, S.W.
Washington, D. C.
Contact: Statistical Subjects, Mr. Thiel
Room 667, Matomic Bldg.
WO 7-4558
Contact: Demand Forecast, Glenn Brokke
WO 7-4130

2.2.2 Highway Statistics 1965**

2.2.3 Highway Statistics to 1965**

2.2.4 Instruction Manual for Preparation and Submission of the 1968 Estimate of the Cost of Completing the Interstate System** February, 1967.

2.2.5 Calibrating and Testing a Gravity Model for Any Size Urban Area** October, 1965.

2.2.6 Traffic Assignment Manual** Office of Planning, Urban Planning Division. June, 1964.

2.2.7 Highways and Economic and Social Changes. Economics and Requirements Division. Office of Research and Development.

2.2.8 Manual 9. Social and Community Value Factors. Vogt-Ivers and Associates. Cincinnati, Ohio, for Ohio Department of Highways. First Edition, 1966.

2.3 Federal Railroad Administration

2.3.1 Office of Highspeed Ground Transportation

2.3.1.1 Northeast Corridor Project
Dr. Paul Shuldiner, Director
Donaho Bldg.
6th and D Street, S.W.

2.3.1.1.1 †"Description of Projections of Natural Population Increase and Labor Force" Robert Thomas Crow. Northeast Corridor Transportation Project Technical Paper No. 1. October, 1965.

2.3.1.1.2 †"Description of the Area System for the Northeast Corridor Transportation Project" David M. Glancy. Northeast Corridor Transportation Project Technical Paper No. 2. December, 1965.

2.3.1.1.3 †"A Model of Output, Income, and Employment in Contract Construction in the Northeast Corridor Region" Robert Thomas Crow and Margaret Ann Burns. Northeast Corridor Transportation Project Technical Paper No. 3. February, 1966.

2.3.1.1.4 †"The Abstract Mode Model: Theory and Measurement" Richard E. Quandt and William J. Baumol. Northeast Corridor Transportation Project Technical Paper No. 4. June, 1966.

2.3.1.1.5 "Study Design" Northeast Corridor Transportation Project Technical Paper No. 5. July, 1965.

2.3.1.1.6 "Method for the Initial Superdistrict Projections of Northeast Corridor Population, Employment, and Income" Robert Crow, et. al. Northeast Corridor Transportation Project Technical Paper No. 6. August, 1966.

2.3.1.1.7 Some Aspects of Discriminant Functions and Other Interurban Modal Split Models. Arrigo Mongini. Traffic Research Corporation. October, 1965 (for the National Bureau of Standards).

2.3.1.1.8 Modal Split Models for Interurban Travel. Traffic Research Corporation. June, 1965 (for the National Bureau of Standards).

2.3.1.1.9 Multimode Assignment Model. J.M. McLynn and R.H. Watkins. Davidson, Talbird, and McLynn. August, 1965.

3.0 CIVIL AERONAUTICS BOARD
1825 Connecticut Avenue, N.W.
Washington, D. C. 20428
Public Information Office: 202-382-6031
Statistics Section: 202-343-7611

3.1 Reports to Congress. Fiscal Year 1966**

3.2 Local Service Air Carriers' Unit Costs. Year Ended September 30, 1966.

3.3 Air Carrier Traffic Statistics. Vol - XII-12. 12 Months Ended December 31, 1966.

3.4 Samuel L. Brown, "Measuring the Elasticities of Air Travel." Reprinted from 1965 Business and Economic Statistics Section Proceedings of the American Statistical Association.

3.5 Forecasts of Passenger Traffic of the Domestic Trunk Air Carriers, Domestic Operations, Scheduled Service 1965-1975. Staff Research Report No. 5. Research and Statistics Division, Bureau of Accounts and Statistics. September, 1965.

3.6 Forecasts of Scheduled Domestic Air Passenger Traffic for the Eleven Trunkline Carriers 1968-1977. Irving Saginor. Economic Research Division, Planning, Programming, and Research Division, Bureau of Economics. September, 1967.

3.7 Air Freight Forwarder Statistics. CAB Form 244. Form T-3 by Company, Room 709. CAB adjacent to library in Room 710. Must be collected manually.

3.8 Domestic Origin-Destination Survey of Airline Passenger Traffic. Annual. ALTA. (We can use Allegheny's copy in Washington to copy the data which we require.)

3.9 Book of Official CAB Airline Route Maps and Airport to Airport Mileages. ALTA. (We can use Allegheny's copy in Washington to copy the data which we require.)

4.0 INTERSTATE COMMERCE COMMISSION
Constitution and 12th Avenue, N.W.
Washington, D. C. 20423
Bureau of Economics - Room 5355, 202-737-9765 Ext. 469
Bureau of Publications - Room 1349, 202-737-9784

4.1 80th Annual ICC Report 1966** (includes Publications List)

4.2 Transport Statistics in the United States. Seventy-ninth Annual Report for the Year Ended December 31, 1965. Transport Statistics in the United States. Detailed data on traffic, operations, equipment, finances, and employment for carriers subject to the Interstate Commerce Act (rail carriers, water carriers, oil pipelines, freight forwarders, Railway Express, Inc., Pullman Co., and private car owners).

4.3 Railroad Carload Waybill Sample. Bureau of Accounts.

Railroad Carload Waybill Sample Publications[3]

Statement TD-1, Territorial Distribution, Traffic, and Revenue by Commodity Classes. Number of carloads, tons, revenues, short-line car miles, short-line ton-miles, average tons per car, average miles per ton, average miles per car, average revenue per 100 pounds, average revenue per car, average revenue per car-mile, and average revenue per ton-mile by commodity groups and classes, for traffic within and between major territories.

Statements MB-1, -2, -3, -4, and -5, Mileage Block Distributions. Designed to analyze rail carload traffic in terms of length of haul. Show carloads, tons, revenue, short-line ton-miles, short-line car-miles, average tons per car, average short-line haul, and average revenues per hundredweight, per car, per short-line car-mile, and per short-line ton-mile, distributed by commodity, territorial movement, and type of rate for selected mileage or short-line length of haul blocks. Statement MB-1 provides data for products of agriculture, MB-2 for animals and products, MB-3 for products of mines, MB-4 for products of forests, and MB-5 for manufactures and miscellaneous and forwarder traffic.

Statement MB-6, Mileage Block Progressions. Contains data for each commodity class similar to those presented in other MB publications for a lesser number of mileage blocks.

Statements SS-1, -2, -3, -4, -5, and -6, State-to-State Distribution. Contain data on a State-to-State basis for the same characteristics as shown in Statement TD-1. Each publication covers commodity classes in a major commodity group or groups.

Statement SS-7, State-to-State Distribution. Shows tons of freight originated and terminated by State and by commodity class.

Statements TC-1, -2, and -3, Distribution by Type of Car. Develop rail carload traffic characteristics in terms of type of car equipment used. Statement TC-1 shows the number of carloads by commodity class, type of car, and mileage block. Statement TC-2 contains data for the number of carloads by commodity class, type of car, and weight category. Statement TC-3 shows the number of carloads by commodity class, type of car, and territorial movement.

Statement MS-2A, Petroleum Products. Contains annual totals for the number of carloads and tons for selected petroleum products by movement between Petroleum Administration Districts.

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[3]Prepared by Bureau of Economics

4.3.1 Territorial Distribution. Traffic and Revenue by Commodity Classes. Statements TD-1. 1959. 1960. 1962. 1963. 1964.

4.3.2 Mileage Block Distributions. Statements MB-1, -2, -3, -4, -5. None

4.3.3 Mileage Block Progressions. Statements MB-6. None.

4.3.4 State-to-State Distributions. 1959. 1960. 1961. 1962.
SS-1. All Commodities. Traffic and Revenue.
SS-2. Products of Agriculture. Traffic and Revenue.
SS-3. Animals and Products. Traffic and Revenue.
SS-4. Products of Mines. Traffic and Revenue. (No 1959 Edition)
SS-5. Products of Forests. Traffics and Revenues.
SS-6. Manufacturers and Miscellaneous and Forwarder Traffic (C.L.). Traffic and Revenue.

4.3.5 State-to-State Distribution[1] Tons of Revenue Freight Originated and Tons Terminated by States and By Commodity Class. Statements SS-7. 1959. 1960. 1961. 1962.

4.3.6 Distribution by Type of Car. Statements TC-1, -2, -3. None.

4.3.7 Petroleum Products[2] Statement MS-2A.

4.3.8 [3]Freight Revenue and Wholesale Value at Destination of Commodities Transported by Class I Line-Haul Railroads** Bureau of Economics and Statistics. Statement No. 6112. 1959.

4.3.9 [3]Freight Commodity Statistics** Class I Railroads in the United States. For the Year Ended December 31, 1963. Statement No. 64100, and For the Year Ended December 31, 1964. Statement No. 66100, and For the Year Ended December 31, 1965. Statement No. 67100. Bureau of Accounts. Freight Commodity Statistics, Class I Railroads in the United States. Carloads and tons of revenue freight originated, terminated, and received from connecting carriers, and gross freight revenue.

4.3.10 [3]Motor Carrier Freight Commodity Statistics, Class I Common and Contract Carriers of Property** For the Year Ended December 31, 1961. Statement No. 6402. Bureau of Accounts. Sixth in Series For the Year Ended December 31, 1962. Statement No. 64200. Seventh in Series.
Motor Carrier Freight Commodity Statistics, Class I Common and Contract Carriers of Property. Numbers of truckloads and tons of freight originated, terminated, and delivered to connecting carriers, and gross freight revenue.

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1. Attempting to obtain for 1963, 1964 ff.
2. Attempting to obtain for 1959 ff.
3. Historical data and documents in numbered series exist but have not yet been received.

4.3.11 [1]Rail Carload Unit Costs by Territories** Bureau of Accounts. For the Year 1962. Statement No. 2-64 and Statement 4-64. For the Year 1963 and For the Year 1964 and For the Year 1965.

4.3.12 [1]Cost of Transporting Freight by Class I and Class II Motor Common Carriers of General Commodities** Bureau of Accounts.

1963 - Rocky Mountain Region. Statement No. 2-65.
Pacific Region. Statement No. 3-65.
Middlewest Region. Statement No. 9-64.
Performing Transcontinental Service. Statement No. 4-65.

1964 - East-South Territory. Statement No. 1-66.
East-Central Territory. Statement No. 2-66.
South-Central Territory. Statement No. 3-66.
Middle Atlantic Region. Statement No. 4-66.
Southern Region. Statement No. 5-66.

1965 - By Regions or Territories. Statement No. 7-66.
New England Region. Group I. Within New England Region. Statement No. 2-67.
New England Region. Group II. Between New England and New York City and Beyond. Statement No. 3-67.
Southwest Region. Statement No. 5-67.
Central Region. Statement 6-67.

4.3.13 Transportation Revenue and Traffic of Large Oil Pipeline Companies. Statement Q-600.
Transportation Revenue and Traffic of Large Oil Pipeline Companies. Transportation revenue and number of barrels of oil originated and received from connections, present and preceeding year.

4.3.14 Revenue and Traffic of Carriers by Water. Statement Q-650.
Revenue and Traffic of Carriers by Water. Freight revenue, number of tons of revenue freight carried, revenue ton-miles, passenger revenue, and number of passengers carried.

1. Historical data and documents in numbered series exist but have not yet been received.

5.0 FEDERAL COMMUNICATIONS COMMISSION
Room 7530
Pennsylvania Avenue between 12th and 13th Streets, NW
Washington, D.C. 20554
202-393-3620, extension 497

5.1 32nd FCC Annual Report for the Fiscal Year 1966

5.2 Statistics of Communications Common Carriers. Year Ended December 31, 1965.

6.0 FEDERAL POWER COMMISSION
441 G street, NW
Washington, D.C. 20426
202-386-6102 (Office of Public Information)

6.1 1966 Annual Report.

6.2 Statistics of Natural Gas Companies 1962[1]

1. Attempting to obtain 1960, 1961, 1963, 1964, 1965, 1966 issues

7.0 DEPARTMENT OF DEFENSE

7.1 Department of the Army

7.1.1 Corps of Engineers
Scientific and Technical Information Division
Office of the Chief of Engineers
U.S. Department of the Army
Washington, D. C. 20315
202-697-2539

7.1.1 Waterborne Commerce of the United States. Calendar Year 1965 Part 1, Waterways and Harbors on the Atlantic Coast; and Part 2, Waterways and Harbors of the Gulf Coast, Mississippi River System and Antilles.

For Sale by: Division Engineer
U.S. Army Engineer Division,
New England
424 Trapelo Road
Waltham, Massachusetts, 02154

8.0 DEPARTMENT OF LABOR

8.1 Bureau of Labor Statistics

Branch of Information
441 G Street, NW
Washington, D. C. 20212
202-961-2913

8.1.1 Employment and Earnings Statistics for States and Areas 1939-66. Bulletin Number 1370-4. July 1967.

9.0 DEPARTMENT OF AGRICULTURE

9.1 Agricultural Research Service

9.1.1 Consumer and Food Economics Research Division
Federal Center Building
Bellcrest Road at East-West Highway
Hyattsville, Maryland 20781
301-388-8451
Contact: Information Division, ARS
301-388-8305

9.1.1.1 "Food Consumption in Households in the United States, Spring 1965." A Preliminary Report. ARS-62-16. August, 1967.

9.1.1.2 "Money Value of Food Used by Households in the United States, Spring 1965." September, 1966.

9.2 ECONOMIC RESEARCH SERVICE
14th and Independence Avenue, SW
Washington, D.C. 20250
202-388-6933

9.2.1 Grain and Feed Statistics Through 1961
Statistical Bulletin Number 159. Revised
June 1962. Economic and Statistical Analysis Division.

9.2.2 Supplement for 1964 to Grain and Feed Statistics
Statistical Bulletin Number 159. March 1965.

9.2.3 "National Food Situation." Quarterly. August 15, 1976 issue.

10.0 DEPARTMENT OF THE INTERIOR

10.1 Bureau of Outdoor Recreation

19th and c Streets, NW
Washington, D. C. 20245
202-373-11

10.1.1 Projections to the Years 1970 and 2000: Economic Growth, Population, Labor Force and Leisure, and Transportation.

Outdoor Recreation Resources Review Commission Study Report 23, 1962.

10.2 OFFICE OF OIL AND GAS
18th and C Streets, NW.
Washington, D.C. 20240
202-343-3831

10.2.1 U.S. Petroleum and Gas Transportation Capacities. National Petroleum Council. 1967. (Given to Wilbur Smith and Associates)

10.3 GEOLOGICAL SURVEY
1200 South Eads Avenue
Arlington, Virginia

10.3.1 "Index to Topographic Maps of Pennsylvania"

10.3.2 "Pennsylvania Base Map"

18.0 NATIONAL ACADEMY OF SCIENCES

18.1 National Research Council

18.1.1 Highway Research Board
2101 Constitution Avenue, NW (Mailing Adress)
Washington, D.C. 20418

Location: 1707 H Street, NW
Washington, D.C.
202-961-1336

18.1.1.1 "Trends in Automobile Ownership and Indicators of Saturation." Walter H. Bottiny.

18.1.1.2 "The Use of Metropolitan Area Census Data For Transportation Planning." Edmond L. L. Kanwit and David M. Glancy

18.1.1.3 Criteria for Highway Benefit Analysis Volume I. Final Report. Volume II. Supplement to Final Report. Volume III. Author Index A Condensed Version of the Final Report. Project 2-1 Loan

20.0 TRANSPORTATION ASSOCIATION OF AMERICA
1101 17th Street, NW
Washington, D. C. 20036
202-296-2470

20.1 Transportation Facts and Trends. 1963, 1964, 1966, 1967. Quarterly Supplement, July 1967.

20.2 Transportation Research. A Survey of Current and Potential Transportation. Research Projects of a Policy-Type Nature. Fifth Edition. December, 1966.

21.0 AIR TRANSPORT ASSOCIATION OF AMERICA
1000 Connecticut Avenue, NW.
Washington, D. C.
202-296-5800

Publications not available to non-members except those in ATA Laboratory.

21.1 [1]Domestic Origin-Destination Surveys of Airline Passenger Traffic. Annual

22.2 [1]Book of Official CAB Airline Route Maps and Airport to Airport Mileages.

21.3 Public Benefits Provided by the Local Airline Industry. Report Number 5. Systems Analysis and Research Corporation. April 1967. (Provided by Allegheny Airlines)

1. Will arrange to borrow these

22.0 ASSOCIATION OF AMERICAN RAILROADS
Transportation Building
Washington, D.C. 20006
Library: Room 1002
202-NA8-1591 Public Relations

22.1 Standard Transportation Commodity Code.

22.2 Yearbook of Railroad Facts. 1967 Edition.

22.3 A Review of Railroad Operations in 1966.
Burton N. Behling, Bureau of Railway Economics, AAR.

22.4 Statistics of Railroads of Class I in the United States
Years: 1955 to 1965. Statistical Summary Number 50.
September 1966. Bureau of Railway Economics.

22.5 A Guide to Railroad Cost Analysis. Bureau of Railway Economics.

23.0 AMERICAN TRUCKING ASSOCIATION
1616 P Street, NW
Washinton, D. C. 20036
202-DU 7- 3200

23.1 American Trucking Trends. 1966, 1964, 1963, 1962, 1961.

23.2 1966 Banker's Analysis of the Motor Consumer Industry for 1965. Arthur J. Bruen, Jr.

23.3 Who's "In" in Piggyback? Department of Research and Transport Economics.

23.4 Highways, Trucks, and New Industry: A Study of Changing Patterns in Plant Location. James F. McCarthy. ATA Foundation.

24.0 NATIONAL ASSOCIATION OF MOTOR BUS OWNERS
839 17th Street, NW.
Washington, D. C. 20006.
202-ME 8-5237

24.1 Bus Facts. 34th Edition - 1966

24.1 Development of Intercity Bus Transportation

25.0 AUTOMOBILE MANUFACTURERS ASSOCIATION
320 New Center Building
Detroit, Michigan 48202

25.1 Automobile Facts and Figures. 1967, 1966, 1962, 1961.

25.2 Motor Truck Facts. 1967, 1965.

26.0 RAILWAY SYSTEMS AND MANAGEMENT ASSOCIATION
163 East Walton Street
Chicago, Illinois 60611
312-943-5542

26.1 †Unit Train Operations. January 1967.

30.0 NATIONAL PLANNING ASSOCIATION

30.1 State Population, Net Migration, Labor Force and Industry Employment Trends to 1975. March, 1965. Borrow from Pennsylvania State Planning Board.

30.2 Revised Statistics of Output, Employment, and Productivity. U.S. Economy and Selected Industries 1947-1985. Borrow through Pennsylvania State University.

38.0 WESTINGHOUSE AIR BRAKE COMPANY
Melpar Division
7700 Arlington Boulevard
Falls Church, Virginia
Contact: Jim Anders
Lou Costello

38.1 Demand, Supply, and Economic Impact of Tranport in the Keystone Corridor. February, 1967.

38.1.1 Demand Analysis. Appendix I

38.1.2 Route Analysis. Appendix II

38.1.3 Systems Analysis. Appendix III

38.1.4 Detail of Production AREA Listings
1963 Census of Transportation.
Computer Print-outs:Loan

80.0 PENNSYLVANIA STATE UNIVERSITY
Contact: John Coyle

80.1 Planned versus Unregulated Development in a Suburban Community. A Case Study, by J.C. Frey, H.K. Dansereau, C.P. Gratto, J.W. Markham, and R.D. Pashek. March, 1960. Department of Agricultural Economics and Rural Sociology. Agricultural Experiment Station. In Cooperation with The Bureau of Public Roads and the Pennsylvania State Department of Highways.

80.2 The Economic and Social Impact of Highways. A Progress Summary of the Monroeville Case Study. June 1960. Progress Report 219. Agricultural Experiment Station. In cooperation with the Bureau of Public Roads and the Pennsylvania State Department of Highways.

80.3 Farms and New Highways: Problems and Adjustments Melvin B. Rockey and John C. Frey. Research Report 1, 1964. Institute for Research on Land and Water Resources

80.4 Selected Attitudes Toward Highway Change. Monroeville and Blairsville Compared. H. Kirk Dansereau. Research Report 2, 1964. Institute for Research on Land and Water Resources.

80.5 Differential Highway Use and Selected Socio-Economic Characteristics. John R. Maiolo and H. Kirk Dansereau. Research Report 3, 1964. Institute for Research on Land and Water Resources.

80.6 A Preview of Resource Economic Problems in the Northeast. April 1965, Northeast Regional Resource Economic Committee Report 1.

80.7 Highway Development: Community Organization and Social Stratification. H. Kirk Dansereau. Research Report 4,1965. Institute for Research on Land and Water Resources.

80.8 Travel Pattern Study. State College - Bellefonte Pennsylvania Area. Thomas B. Davinroy. Research Report 6, 1965. Institute for Research on Land and Water Resources.

80.9 Factors That Influence Economic Development at Non-Urban Interchange Locations. Owen H. Sauerlender, Robert B. Donaldson, Jr. and Richard D. Twark. Research Publication 58. Institute for Research on Land and Water Resources.

80.10 Blairsville: A Bypass Study. The Economic and Social Impact of a Highway. June 1962. Agricultural Experiment Station, In Cooperation with The Bureau of Public Roads and The Pennsylvania State Department of Highways.

80.11 Land Use and Land Value in Fair Interchange Communities An Interim Report on the York Study. Raymond W. Eyerly. Research Report 7, 1966. Institute for Research on Land and Water Resources

80.12 Specified Social Determinants of Attitudes Toward Community Planning and Zoning. H. Kirk Dansereau, Richard A. Rehberg, and John R. Maiolo. Research Report 8, 1966. Institute for Research on Land and Water Resources.

80.13 The Impact of Interchange Development on the Economy of Clinton County. Hays B. Gamble, David L. Raphael and Owen H. Sauerlender. Research Report 10, 1956. Institute for Research on Land and Water Resources.

80.14 Use of Computers in the Storage and Retrievance of Severance Effect Information. Harold H. Taylor and Milton C. Hallberg. Research Report 12, 1966. Institute for Research on Land and Water Resources.

80.15 Highways and Communities. John Maiolo. The Pennsylvania State University. June, 1966. The Institute for Science and Engineering: Institute for Research on Land and Water Resources. (Cooperating) The Pennsylvania Department of Public Roads. University Park, Pennsylvania.

80.16 Toward a Simulation of Land Use for Highway Interchange Communities. Thomas H. Eighmy and John J. Coyle. Research Publication 51, Institute for Research on Land And Water Resources.

80.17 Planning, Zoning, and Interchange Protection: A Report of Leadership Attitudes. John R. Maiolo and H. Kirk Dansereau. Research Publication 54. Institute for Research on Land and Water Resources.

80.18 A Predictive Model of Economic Development at Non-Urban Interchange Sites on Pennsylvania Interstate Highways. Richard D. Twark. The Pennsylvania State University. June, 1967.

81.0 UNIVERSITY OF WASHINGTON

82.0 UNIVERSITY OF MICHIGAN.

82.1 Automobile Ownership and Residential Density. John B. Lansing and Gary Hendricks. Survey Research Center. Institute for Social Research. Prepared for the Bureau of Public Roads.

100.0 PENNSYLVANIA STATE PLANNING BOARD
Contact: Irving Hang, Executive Director
350 Capitol Building
Hamsburg, Pennsylvania 17120
717-787-2086

100.1 An Economic Atlas of Pennsylvania. E. Willard Miller, Department of Geography, Pennsylvania State University. 1964.

100.2 Project 70 - Open Space Land Acquisition Program. Third Annual Progress Report, 1967

100.3 The Population of Pennsylvania. Projections to 1980. Temple University, Office of Research and Specialized Services. June 1, 1963.

100.4 The Population of Pennsylvania: A Social Profile. September, 1963.

100.5 Regional Development Reconnaissance. Regions 1 through 12. 1965 and 1966.

100.6 †Capital Program 1967-1973, May 1967.

100.7 †Statewide Outdoor Recreation Plan: An Interim Report. July, 1965.

100.8 A Rationnale for Public Investment in Appalachia Pennsylvania. An Interim Statement. March 31, 1966.

100.9 The Delaware River Port and Summary. Fammer Greene, Siler Associates and W.B. Saunders and Company. December, 1965.

100.10 †Re-evaluation of the Practicability of the Lake Erie-Ohio River Canal. June, 25, 1965.

101.0 DEPARTMENT OF INTERNAL AFFAIRS

101.1 1967 Pennsylvania Statistical Abstract.
Ninth Annual Edition.**

100.11 † Potential Impact of the Delaware Water Gap National Recreation Area on its Surrounding Communities and Summary. Robert R. Nathan Associates, Inc. February, 1966.

102.0 DEPARTMENT OF HIGHWAYS[1]

Personal contacts: Thomas Thompson - Bureau of Planning Statistics
787-4055: Loadometer decks and data.
Joseph McMurtry, Director of Advance.

102.1 Statewide Trip Tables for 1963, 1965, and 1990.
Bureau of Highway Planning Statistics.

102.3 Statewide Origin and Destination Study.
1963, 1975, and 1990. Edwards and Kelcey
Engineers and Consultants, July, 1966.

102.3.1 Trip Record Processing. Interim Report 1, September, 1964.

102.3.2 Socio-Economic Trends and Forecasts, Interim Report 2, 1965.

102.3.3 1963 Statewide Traffic Estimation, Interim Report 3, February, 1966.

102.3.4 Compendium Statistical Data and Technical Notes, May, 1966.

102.3.5 Statewide Trip Tables for 1963, 1975, and 1990.
Bureau of Highway Planning Statistics.

102.5 Development of Traffic Prediction
Techniques in Non-Metropolitan Areas of Pennsylvania.
Interim Planning Memorandum II, September, 1967. Institute
for Transportation Studies, Civil Engineering Department,
Villanova University. Villanova, Pennsylvania.

1. Contacts other than those listed coordinated through Wilbur Smith and Associates.

102.6 Pennsylvania Vehicle Use Study Year of 1953-1953, Planning Division.

102.7 Loadometer Survey. 1966[1]

102.7.1 Publication

102.7.2 †Punch Cards and (3,5,6) and Card Format

102.7.3 †Coding Instructions. Form L1-1.1962. Form L-2.(Rev.6-66) Form L-3. (Rev. 6-62). Form L-4. (5-62).

102.7.4 †Coding Manual for States, Counties, and Cities of the United States. (Excluding Pennsylvania) Index V. 1957, Map - Basic Coding of Areas Other than Adjacent States. Statewide R & D Study Multiple Screen Line Study,1967. Map: Basic Coding Adjacent States, 1957.

102.7.5 †1966 Coding Manual for Counties, Cities, and Communities in Pennsylvania, Index TV and 1965 Map of Coding Manual.

102.8 Pennsylvania Traffic Data from Automatic Recorder Stations. July, 1966. Volume 5 - Number 2. Monthly Average Daily Traffic. March-April Inclusive, 1965-66, Bureau of Highway Planning Statistics.[1]

1. Historic data can be acquired as necessary.

102.9 †Prospects for a Four-Phase Continuing Comprehensive Transportation Planning Process for Cities in Pennsylvania. Office of Planning and Programming February, 1964.

102.10 †A Typical Work Program for Phases I and II of Transportation Studies for Cities in Pennsylvania. Office of Planning and Programming. February, 1964.

200.0 APPALACHIAN REGIONAL COMMISSION
1666 Connecticut Avenue, NW.
Washington, D.C. 20235
202- 967-4103

200.1 Development and Demonstration of Improved Engineering Productivity for the Design Phase of Pre-Construction Engineering. For the North Carolina State Highway Commission, Ohio Department of Highways, Appalachian Regional Commission and U.S. Department of Transportation. Bureau of Public Roads. Franklin Engineering Associates, Limited. May, 1967

200.2 Exhibit 19 to Plan of Survey for Development of Water Resources in Appalachia. Economic Base Study Information. U.S. Army Corps of Engineers. Office of Appalachian Studies, P.O. Box 1159, Cincinnati, Ohio 45201.

200.3 Appalachian Highway Planning Report and Preliminary Report. Supplement to Appalachian Highway Planning Reports. Appalachian Regional Commission under Contract with the U.S. Department of Commerce, Bureau of Public Roads E.S. Preston and Associates, Limited. July, 1965.

200.4 Appalachian Development Highway System and Access Roads. For Appalachian Regional Commission. E.S. Preston and Associates, Limited. December, 1966.

201.0 PITTSBURGH AREA TRANSPORTATION STUDY.

201.1 Volume 1 Study Findings 1961.

201.2 Volume 2 Forecasts and Plans 1962.

200.0 Hans H. Landsberg, Leonard L. Fischman, and Joseph L. Fisher, Resources in America's Future, Patterns of Requirements and Availabilties, 1960-2000. Published for Resources for the Future, Inc. The Johns Hopkins Press:1963.